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Vol. XVIII, No. 5 **MAY, 1929**

MAY 27 1929

JOURNAL

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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THE 77th ANNUAL MEETING WILL BE HELD AT RAPID CITY (BLACK HILLS), SOUTH DAKOTA, DURING WEEK OF AUGUST 26, 1929.

F. W. Brown, Lead, So. Dak., Local Secretary

The 1929 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conferences of Pharmaceutical Association Secretaries will also be held at Rapid City, same time and place.

For Association Roster and Roster of the Boards of Pharmacy, of Officers of Pharmaceutical Associations, Local Branches, see pages x, xii, xiv, etc.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

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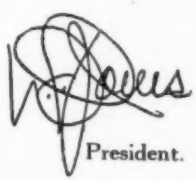
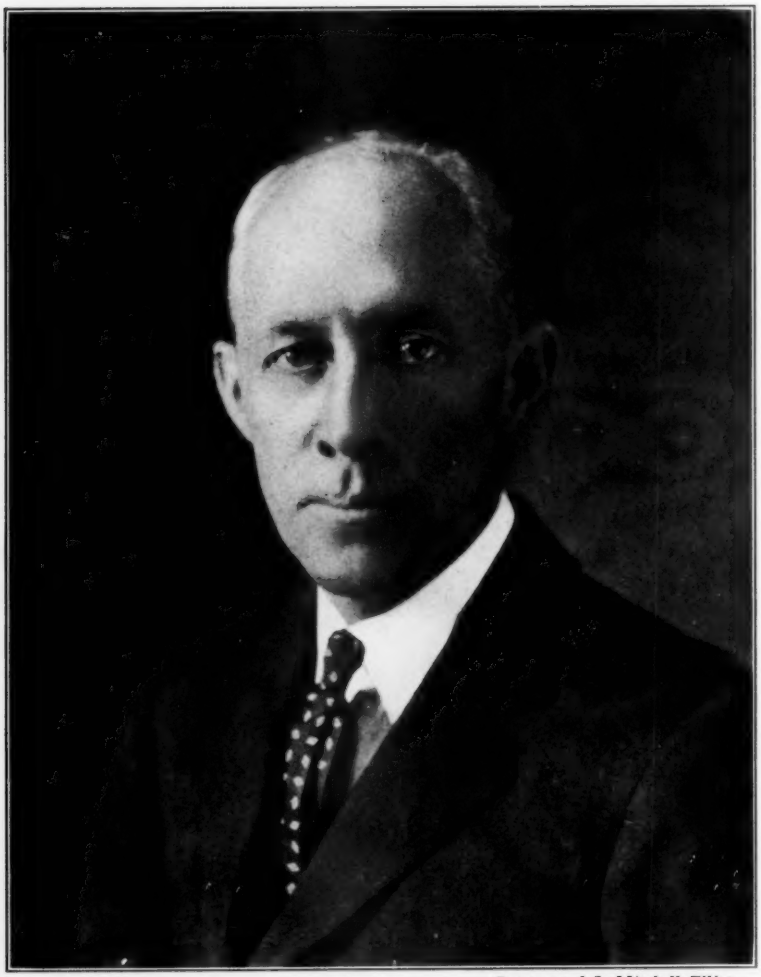
SOME person is authority for the information that when Cayenne pepper is added to the diet of white hens which have hatched from very carefully selected eggs, their feathers become pale rose in color, and they flush to a brilliant red when the weather is damp; thus the increasing humidity indicates the coming of a storm. These hens thus become veritable living barometers, and the progression of color from pale to brilliant is so exact that a scarlet hen stalking about the barnyard is regarded as certain prophecy of a storm that may be expected within twelve hours.

I declare! Speaking about competition in the drug trade—"we are not half bad off," when compared with the Weather Bureau, at Washington, regardless of all of its wonderful chain system!



President.

Watertown, S. D., May 1929.



Courtesy of J. Mitchell Elliot

CLARENCE M. KLINE.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XVIII MAY, 1929 No. 5

CLARENCE MAHLON KLINE.

Clarence Mahlon Kline, president of the National Wholesale Druggists' Association for 1928–1929, has been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION for twenty-seven years. He is also a member of the Pennsylvania Pharmaceutical Association, of the American Chemical Society and the Society of Chemical Industry. He is a director of the Philadelphia Drug Exchange and a former president; vice-president of the Philadelphia College of Pharmacy and Science, and member of the Executive Committee of the National Drug Trade Conference.

The President of the N. W. D. A. is a native of Philadelphia, and, *D. v.*, will celebrate his 50th birthday in 1930; he is the son of the late Mahlon N. Kline, for many years an active member of the A. PH. A.

Clarence M. Kline received his early education in William Penn Charter School of Philadelphia and was graduated from Sheffield Scientific School, Yale University, in 1902. After graduation Mr. Kline entered the laboratory of Smith, Kline & French Company; he was made vice-president in 1910 and, in 1921, elected president of the Company.

The National Wholesale Druggists' Association has been nearest to Mr. Kline in organization work; for many years he has taken part in its deliberations and in 1922 he was elected for a three-year term to its Board of Control and again in 1926, and has served as its chairman; for a number of years he has been chairman of the N. W. D. A. legislative committee.

Mr. Kline has a broad interest in athletics, his preference being for riding; he belongs to the Rittenhouse, Racquet, Down Town and St. Anthony Clubs. He is not married and enjoys a happy home life with his mother.

President Kline's qualifications as presiding officer enable him to arrange committee work and discussions for thorough study of the subjects and bring the questions involved to decisions.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

COMMON INTERESTS.

PHARMACY in its various divisions touches nearly all other activities and if pharmacy is important then it should receive consideration accordingly. That coördinated coöperation between the divisions of the drug industry is for the good of all hardly requires comment, but it is sometimes overlooked.

There should be coöperation between the Departments of Government and the pharmaceutical activities; this quite generally obtains, but misunderstandings do occur and, hence, discussions on debatable questions should be arranged for with the aim of adjusting questions in the proper spirit and with the thought uppermost that the public is to be served. The question of therapeutic action is in many instances debatable and unless there is a purpose to apply reason, discussions will not solve that problem. There always is and will be differences of opinion between those who are charged with regulation and administration duties and those who manufacture products in which the question of therapeutics is involved. After all, practice is entitled to consideration; the very fact that viewpoints change answers that. The writer recalls striking off from a list quite a number of drugs which were deemed of no value, but was surprised that a majority of them were included by prescribers, and dealers in them proved their usage. The fine points of description, of action, are sometimes so fine that if the position of the individuals were changed, the judgments, too, would be transposed; contentions and heated arguments, due chiefly to differences of opinion, may mean a matter of loss and profit, without benefit or value to the prescriber, patient or consumer.

The final reference is in some respects the more important and mention of it is prompted by a number of hospital orders which would have cost lives, if it had not been for the supervision of a pharmacist, and several recent deaths which certainly would have been prevented if a qualified pharmacist had been in charge. Why it should be permissible to conduct a hospital pharmacy without a qualified pharmacist in charge; why doctors in hospitals, military and others, do not insist, for their own protection and of the patients, that qualified pharmacists are made part of the service is not easily understood. There is need for reasonable cooperation when matters of common interest are involved.

THE STATE PHARMACEUTICAL ASSOCIATION MEETINGS.

SEVERAL of the state pharmaceutical associations and also national organizations have held annual meetings; the greater number of the former will convene during the succeeding months. Just as these associations depend on the loyalty and support of individual membership, so also the body pharmaceutic and the drug trade in general must realize, or do realize, that there can be little progress without a sense of loyalty and faith in the calling; that no single group

can stand alone and is helpless, in degree, without the support and coöperation of the others.

In the pharmaceutical and drug-trade activities there are always problems to be solved and situations to be met which require the study of all concerned; unless the mutual relations are given consideration there can be no successful outcome. There must be recognition of common interests of manufacturers, wholesalers and retailers.

There is need not only for a larger percentage membership of pharmacists in state associations but for greater activity and participation in the promotions of pharmacy. The strength of associations is in numbers, provided a majority take an active part and accept the decisions reached after thoughtful deliberations. This not only speaks for larger membership but for a working together to adjust pharmacy to changing conditions and seeking new ways and methods for service. Educational standards have been advanced through Association efforts, so also continued and beneficial results will follow well-directed coöperation in behalf of legislative matters that will serve the public and promote pharmacy.

Incidentally, attention should probably be called to Association officials that delegates should be chosen for representation of the respective organizations at the U. S. Pharmacopœial Convention in Washington, May 1930.

THE COMING PHARMACISTS.

THE thoughts and acts of the young men and women who during the next few months will become accredited pharmacists will show the influence of those who have taught them.

It has been repeated for centuries that the problems of the day are more difficult than ever before; it was said by our forefathers and it will be said by those who now enter business or professional activities. Those who preceded us solved some of the problems that were left to them, others they threw aside as faulty; so also, we have our problems, some of which disturb us; others are about to be solved and new ones are looming up before us; the difficulties they present point out our duties and give us opportunities; the solution or adjustment of them aids in our uplift and advancement in the better service of humanity.

The young pharmacists have been taught the essentials of the drug business and the importance of pharmacy as the foundation of it. The problems and opportunities confronting them require that they put into practice their belief and faith in pharmacy. No trade or profession is free from delinquents, but members of faculties can draw conclusions anent the value of their work by observing the career of the alumni.

The writer has commented before in these columns that alumni influence pharmacy and this influence will express in a degree the ideals and the viewpoints of the institution from which these students have received their credentials; and emphasizes the necessity for alumni and faculties to keep in touch with each other for their good and the good of pharmacy.

This comment is concluded with the statement that the young pharmacists can best carry out their duties, achieve success and contribute to the advance-

ment of pharmacy and its service, by coöperating with those who now welcome them to share in the work of local, state and national associations.

PUBLICITY FOR PHARMACY.

PHARMACY and the achievements of pharmacy should more frequently be mentioned in the press columns and with an optimism that conveys assurance of its importance to those served thereby. The announcement that preliminary steps have been taken for the preparation of a volume written in popular style has enlisted much interest. It is to be a story of pharmacy in chapters dealing with the quest for health, the dawn of pharmacy; sources of drugs, how made and how standardized; and the significance of the retail pharmacy. The contributors to the symposium are well and favorably known to pharmacy—John C. Krantz, Jr., James H. Beal, Oliver Kamm, Alfred R. L. Dohme, E. F. Kelly, Heber W. Youngken, William J. Husa, E. H. Volwiler, John F. Anderson, J. C. Munch and W. Bruce Philip.

The publication of such a book presents opportunities for making the public acquainted with pharmacy in a way not heretofore attempted. Chemistry has reached the public eye with a number of books, and likewise medicine. Three volumes—"Devils, Drugs and Doctors," by Howard W. Haggard, "The Struggle for Health," by Richard H. Hoffmann; "Old Masterpieces in Surgery," by Alfred Brown—have very recently been published.

We have histories of pharmacy, "Popular Science Talks" and, in Germany, a publication comparable to *Hygiene*—dealing with pharmacy, however—has made its appearance. It is expected that "The Story of Pharmacy" will prove not only interesting to the lay reader but a means of publicity of the right kind for pharmacy.

AMERICAN PHARMACEUTICAL ASSOCIATION RESEARCH FUND.

THE AMERICAN PHARMACEUTICAL ASSOCIATION has available a sum amounting to $750.00 which will be expended for the encouragement of research. Investigators desiring financial aid in their work will communicate, before June 1st, with Chairman H. V. Arny, of the A. PH. A. Research Committee, 115 W. 68th St., New York, N. Y., giving their past record and outlining the particular line of work for which the grant is desired.

AMERICAN PHARMACEUTICAL ASSOCIATION ANNUAL CONVENTION, RAPID CITY, SOUTH DAKOTA, AUGUST 26–31, 1929.

TRANSPORTATION ANNOUNCEMENT.

BY THEODORE J. BRADLEY, CHAIRMAN.

THE Mayo Clinic at Rochester, Minnesota, has extended an invitation to the members of the ASSOCIATION to visit the Clinic on their way to the meeting, and, for the convenience of the members from the east and southeast

going to the convention by way of Chicago, the Chicago and North Western Railway is arranging to run a special train or special cars from their passenger terminal, Madison and Canal Streets, Chicago, on the following schedule:

Leave Chicago, Illinois	8:00 P.M., August 24th
Arrive Rochester, Minnesota	7:10 A.M., August 25th
Leave Rochester, Minnesota	9:45 A.M., August 25th
Arrive Rapid City, S. Dak.	7:40 A.M., August 26th

Similar arrangements will be made for those who wish to leave Chicago on August 25th and arrive at Rapid City on Tuesday morning, August 27th.

The westward trip takes us through Milwaukee, Winona, Rochester, Mankato, Brookings, Huron, Pierre and other interesting points. As mentioned in previous announcement, members may use same route returning, or *via* Omaha, or Minneapolis, as desired, without extra cost.

Reduced Summer Excursion Round Trip Fares are available from practically all points in the United States and either your local ticket agent, or Mr. C. W. Gray, General Agent, C. & N. W. Railway Company, 310 Old South Building, Boston, Massachusetts, will be glad to quote exact rail and Pullman charges on request.

The special train will be composed of the highest class all-steel equipment, including drawing room, compartment and open section sleeping cars, as well as dining car and observation lounge car.

Rapid City is located in the heart of the Black Hills, with a cool summer climate and many scenic attractions. . . it certainly merits a record-breaking attendance for the convention, particularly since so few of the members have visited that section of the country.

STATUS OF THE BILL FOR A PHARMACY CORPS IN THE MEDICAL DEPARTMENT OF THE U. S. ARMY.

Printed reports of the hearing on the bill to create a Pharmacy Corps in the Medical Department of the U. S. Army have now been distributed to the secretaries of Pharmaceutical Associations and Boards of Pharmacy, to the deans of the schools and colleges of pharmacy and to the pharmaceutical publications. It is hoped that all state and local associations, boards of pharmacy and schools of pharmacy which have not already done so will take action in approval of this legislation and *that they will so inform their Congressmen and Senators.*

In the seventieth Congress, this will have H. R. No. 16278 and S. No. 5406. It will be re-introduced as soon as the seventy-first Congress assembles in regular session in December. In the meantime the Committee on Pharmacy Corps will collect additional information as to the need for a separate pharmacy corps for submission to the committees on military affairs of the House and Senate. The more complete such authenticated information is the better it will serve the Committee and be a great help in the promotion of the Bill for a Pharmacy Corps.

A good start has been made and if every pharmaceutical organization will do its part, legislation to improve the pharmaceutical service in the Army can be obtained.

SCIENTIFIC SECTION

A PRELIMINARY STUDY ON THE STANDARDIZATION AND STABILIZATION OF MYDRIATICS AND MYOTICS.

Paper V.

BY E. E. SWANSON, H. E. THOMPSON AND C. L. ROSE.

Munch[1] reported a bioassay method for the quantitative determination of mydriatics for use in assaying drug samples where chemical assays are unreliable. Munch and Gittinger[2] later reported a formula for calculating the composition of mixtures of mydriatic alkaloids. The outlined method as reported by Munch[1] was submitted to several collaborators. This report represents a study of their method by one of the collaborators. The writers have a further purpose in studying this method, and that is to apply it in determining the reliability of the chemical method for the standardization and stabilization of mydriatics. One of us (E. E. S.)[3,4,5,6] has reported the unreliability of the chemical methods for assaying aconite, gelsemium and veratrum as compared to the bioassay method, and also that the hydrogen-ion concentration controls the stability of these drugs, particularly aconite and veratrum. There has been some question as to the stability of U. S. P. preparations of belladonna, hyoscyamine and stramonium. These preparations are now under discussion. The chemical method U. S. P. and bioassay method (Munch) will be compared on the above U. S. P. preparations, and also with the hydrogen-ion concentration factor in regard to deterioration and stability. These results will be reported in a later article.

THE METHOD.

To briefly describe Munch's method: A cat is held one foot distant and directly in front of a 100-watt, nitrogen-filled, electric lamp to determine and compare the maximum contractibility of the two pupils under this condition. Five hundredths cc. of a neutral aqueous solution of a mydriatic is applied to the outer margin of one eye. The canthus is compressed and the lids opened and closed until the fluid disappears. At various intervals of time after the application of the mydriatic the cat is again subjected to the same light under the same conditions, and any differences in the diameter of the treated and of the untreated pupil are noted. A satisfactory reaction is produced when the pupil of the treated eye is just preceptibly wider than that of the untreated eye.

In determining the threshold doses of atropine sulphate, homotropine sulphate, ephedrine alkaloid and pseudoephedrine alkaloid, calculations were made in terms of the alkaloid per 1 liter. Ephedrine sulphate and pseudoephedrine

[1] *Jour. A. O. A. C.*, 10 (1927), 383.
[2] *Ibid.*, 11 (1928), 521.
[3] JOUR. A. PH. A., 12 (1923), 957.
[4] *Ibid.*, 13 (1924), 1108.
[5] *Ibid.*, 16 (1927), 296.
[6] *Ibid.*, 17 (1928), 23.

sulphate were calculated in terms of the salt. The minimum effective concentration was determined in mg. of the alkaloid or the salt per 1 liter; 0.05 cc. of the solution was used for each application. The readings were taken according to the following technique: Animal (cat) Number 14 in Table III is used as an example:

Atropine sulphate.	Mydriatic effect.	Pseudoephedrine alkaloid.	Mydriatic effect.
8 mg.	−	2500	−
10 mg.	+−	3000	+−
12 mg.	+	3500	+
14 mg.	++	4000	++

Homatropine sulphate.	Mydriatic effect.	Ephedrine sulphate.	Mydriatic effect.
80 mg.	−	30,000	−
100 mg.	+	40,000	+−
120 mg.	++	50,000	+
		60,000	++

Ephedrine alkaloid.	Mydriatic effect.	Pseudoephedrine	Mydriatic effect.
1500	−	60,000	−
2000	+−	70,000	+−
2500	+	80,000	+
3000	++	90,000	++

− = none.
+− = doubtful mydriatic action.
+ = positive effect or threshold dose.
++ = distinct effect.

DATA.

The following, Table I, represents the minimum effective concentration in mg. of alkaloid per liter, 0.05 cc. of the solution was used for each application. Twelve cats were used, each cat was given at least one test according to the above method. Some cats received four repeated tests:

TABLE I.

Cat no.	Atropine sulphate.	No. of tests.	Scopolamine hydrobromide.	No. of tests.	Hyoscyamine sulphate.	No. of tests.
1	12	3	0.3	2	4	3
2	8.6	3	0.3	2	5	4
3	10	3	0.2	2	4	5
4	10	3			4.2	4
5	12	3				
6	10	3	0.3	2	4.2	4
7	11.3	3	0.4	2	4.6	3
8	12	1			4.6	3
9	12	.			4	1
10	..	.	0.4	2	5.3	3
11	..	.	0.4	2	5	1
12	..	.	0.4	2	4	2
Total tests		22		16		33
Average	10.9		0.34		4.44	

The foregoing table shows that not all cats have the same threshold dose, but, if an average of all the threshold doses is taken, the figures are 10.9 mg. per liter for atropine, 0.34 mg. per liter for scopalmine, and 4.44 mg. per liter for hyoscyamine. A total of 22 tests were made on atropine, 16 tests on scopolamine, and 33 tests on hyoscyamine. Munch[1] reported 12 mg. per liter for the threshold dose for atropine, 0.4 mg. per liter for scopolamine, and 4 mg. per liter for hyoscyamine. He suggested, that in standardizing a cat, the animal should not be used unless it responds to a threshold dose of 12 mg. per liter of atropine. In this report the writers have not selected the cats in this way, but used them regardless of their threshold value. Considering the fact that the cats were not selected, the results agree favorably with those reported by Munch.

Table II represents the check assays of the above alkaloids on the same cats to determine the reliability of the method. This table shows the minimal effective concentrations in mg. of alkaloid per liter; 0.05 cc. of solution was used for each application.

TABLE II.

	Atropine Sulphate.			Scopolamine Hydrobromide.		Hyoscyamine Sulphate.			
Cat no.	1st assay.	2nd assay.	3rd assay.	1st assay.	2nd assay.	1st assay.	2nd assay.	3rd assay.	4th assay.
1	12	12	12	0.3	0.3	4	4	4	
2	8	8	10	0.3	0.3	5	5	4	5
3	10	10	10	0.2	0.2	4	4	5	4
4	10	10	10			5	4	4	4
5	12	12							
6	10	10	10	0.3	0.3	5	5	4	4
7	12	12	10	0.4	0.4	5	5	4	
8	12					4	5	5	
9	12					4			
10				0.4	0.4	5	6	5	
11				0.4	0.4				
12				0.4	0.4	4	4		

Table II shows that each cat had an approximate constant threshold value. Some cats checked in all tests and some did not vary more than is within the error of all biological methods of standardization.

TABLE III.

MINIMAL EFFECTIVE CONCENTRATION IN MG. OF ALKALOID PER LITER. 0.05 CC. OF SOLUTION WAS USED FOR EACH APPLICATION.

Cat no.	Atrop. sulph.	Homatrop. sulph.	Ephedr. alk.	Pseud. ephedr. alk.	Ephedr. sulph.	Pseud. ephedr. sulph.
13	10	80	2500	3500	40,000	70,000
14	12	100	2500	3500	50,000	80,000
15	10	80	2000	3000	60,000	70,000
16	12	100	3000	4000	60,000	80,000
17	14	120	3000	4000	60,000	90,000
18	12	120	3000	4000	60,000	90,000
19	12	100	2500	3500	50,000	80,000
20	12	100	2500	3500	50,000	80,000
Average	11.7	100	2650	3625	53,750	80,000

[1] *Jour. A. O. A. C.*, 10 (1927), 383.

Table III represents the threshold values of atropine sulphate, homatropine sulphate, ephedrine alkaloid and pseudoephedrine alkaloid in terms of the alkaloid. Ephedrine sulphate and pseudoephedrine sulphate are determined in terms of the salt.

The results in Table III show the average amount of alkaloid or salt of the alkaloid required as the threshold dose. This data correlates the results reported by Munch, in that the alkaloids ephedrine and pseudoephedrine are more active as mydriatics than their salts.

Finding the mydriatic method to be quantitative, this method was also used to determine the mydriatic values of five tinctures of Belladonna U. S. P.

TABLE IV.

Tr. no.	Year made.	Bioassay Method. (Munch) Atrop. alk. mg. per 100 cc.	Chemical Method. U. S. P. St. = 0.025 to 0.033.	p_H.
1	1924	0.0600	0.0300	5.97
2	1925	0.0410	0.0308	5.74
3	1926	0.2400	0.0300	5.97
4	1927	0.060	0.0298	5.60
5	1928	0.080	0.0286	5.77

These results show that by the cat-eye method the total amount of alkaloids is higher than is shown by the chemical method. This is probably due to the variability of the alkaloidal content of different lots of the crude drugs. Tincture No. 3, however, shows a discrepancy that is 8 times as active biologically as it is chemically. The other tinctures show approximately $1^1/_3$ to $2^1/_2$ times as active biologically as they do chemically. The increased bioassay results over the chemical results are probably due to the alkaloids, atropine, hyoscyamine and scopolamine. These alkaloids are found to vary in proportion in belladonna drug. This variability is not determined by the chemical method, which represents the total alkaloidal content as ether soluble alkaloids. By the cat-eye method scopolamine is approximately 30 times as active as atropine, hyoscyamine is about 3 times as active as atropine. Therefore, if the alkaloidal content of a certain lot of crude belladonna drug should contain more scopolamine and hyoscyamine than is usually found in the drug it would effect its mydriatic value or bioassay value more than the chemical assay. According to these results the chemical method is not a true method for determining the physiological effects of belladonna. The bioassay method and chemical method do not correlate. The chemical method gave a consistent quantitative assay of all five tinctures while the bioassay showed a variability of $1^1/_2$ to 8 times the activity. A series of tinctures of Belladonna U. S. P. are now being studied to determine more definitely this discrepancy between the chemical and bioassay methods, together with the hydrogen-ion concentration factor, and how it influences the standardization and stabilization of these preparations. The above p_H determinations are approximately the same for all the tinctures.

Some experiments were made on the myotic alkaloids, pilocarpine, physostigmine and arecoline, but the minimum effective concentration which we determined for pilocarpine and arecoline did not correlate with those found by Munch.

Further investigation has been outlined to study (1) the calculation of the

mydriatic value of the alkaloids of belladonna, (2) the effect of different hydrogen-ion concentrations on the deterioration and stabilization of the belladonna preparations and (3) the assay of myotic alkaloids.

CONCLUSIONS.

1. A study of the bioassay method for testing drugs that have a mydriatic action is reported.

2. The mydriatics, atropine sulphate, homatropine sulphate, scopolamine hydrobromide, hyoscyamine sulphate, ephedrine alkaloid, pseudoephedrine alkaloid, ephedrine sulphate and pseudoephedrine sulphate have been studied, and our results correlate with those of Munch.

3. Tinctures of belladonna have been assayed by this method and seem to show no deterioration, but do not correlate with the chemical method. Further work is necessary to determine this discrepancy.

THE LILLY RESEARCH LABORATORIES,
DEPT. OF PHARMACOLOGY,
ELI LILLY & CO., INDIANAPOLIS, INDIANA.

A STUDY OF THE COMPOSITION OF SODIUM BISMUTH TARTRATE.*

BY JOHN H. YOE AND JOHN H. MOTE.

INTRODUCTION.

Although many compounds of bismuth with tartaric acid have been prepared very little has been accomplished towards establishing their composition and structure. The date at which bismuth tartrate compounds were first made seems to be about 1847. Since that time numerous other compounds of bismuth and tartaric acid have appeared whose compositions seem to vary widely, dependent upon the mode of preparation. A number of the earlier preparations are reviewed by Warren[1] in his paper entitled "The Composition of Some Complex Bismuth Tartrates Used in the Treatment of Syphilis." In this paper Warren gives the results of his examination of several commercial specimens of bismuth tartrate. The results of his analyses for bismuth, tartaric acid and sodium or potassium content of the various samples are then compared with the theoretical composition of the compound as claimed by the manufacturers. According to Warren only one of the specimens examined proved to have the composition claimed by the manufacturers. This sample was believed to have the composition approximately represented by the formula:

$$\begin{matrix} CH(OBiO)—COOK \\ | \\ CH(OBiO)—COOBiO \end{matrix} + 4H_2O$$

Warren's examination confirmed this view.

It may be noted that in the analysis of this sample, Warren did not add ammonia water to bring the sample into solution, as he did with the other samples. The aqueous solution itself reacted alkaline to litmus.

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* Contribution from the Cobb Chemical Laboratory of the University of Virginia, No. 54.

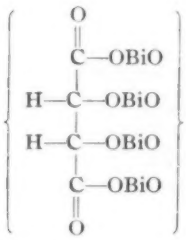
[1] JOUR. A. PH. A., 14 (1925), 478–487.

Among the earlier preparations discussed the most noteworthy seems to be that prepared by Rosenheim and Vogelsang[1] which they claimed to be potassium tri-bismuth tartrate and to which they assigned the formula:

$$\begin{matrix} CHO(BiO)—COOK \\ | \\ CHO(BiO)—COO(BiO) \end{matrix} + 4H_2O$$

This compound contains 67.15 per cent bismuth and 4.21 per cent potassium.

P. A. Kober[2] has prepared a compound of bismuth and tartaric acid which he claims to be sodium tetra-bismuth tartrate. He proposes the following formula which is analogous to that of Rosenheim and Vogelsang for the tri-bismuth tartrate.



Kober considering the method used by Rosenheim and Vogelsang which "consisted in digesting bismuth subnitrate with tartaric acid and an excess of alkali, while heating" came to the conclusion that from thermodynamic considerations the reaction should be carried out without heating. Kober prepared his compound using bismuth hydroxide instead of the subnitrate. The bismuth hydroxide with a slight excess of sodium hydroxide, was added to the tartaric acid and the whole agitated by means of a mechanical shaker, the temperature not being appreciably raised during the process. The sodium-bismuth tartrate was precipitated by adding 95 per cent alcohol.

The present paper is based upon a study of the composition of the sodium-bismuth tartrate prepared by Kober.

EXPERIMENTAL.

Three samples of sodium-bismuth tartrate were used in this study. They were furnished by P. A. Kober and were prepared by his method outlined above.

Dissolving the Compound.—All three samples were found to be very soluble in cold water. When placed in a beaker with a few drops of water the compound first formed a gel which dissolved on the addition of more water (usually 2–5 cc. were sufficient to dissolve a one-Gm. sample). After the sample was in solution it was found that it could be diluted to any desired extent without hydrolysis, but if an attempt be made to dissolve it in a large quantity of water at once, a white precipitate would form. These solutions appeared to be stable up to temperatures at least as high as 70° C. The solutions reacted alkaline to phenolphthalein.

Determination of Bismuth.—The bismuth content was determined by two methods. (Two other methods failed to give consistent results.)

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[1] *Z. anorg. Chem.*, 48 (1906), 205.

[2] *J. Lab. Clin. Med.*, 12 (1927), 962.

(*a*) *Hydrosulphite Method.*—The hydrosulphite method, which makes use of the reducing action of sodium hydrosulphite to get metallic bismuth, is the method used by Kober[1] in the analysis of his bismuth-tartrate compound.

Procedure.—About 0.5 Gm. of the compound was accurately weighed, dissolved in water and diluted to 25 cc. The solution was warmed to 50–70° and 1.5 Gm. of sodium hydrosulphite added. (The sodium hydrosulphite was dissolved in 10 cc. of 2.5 per cent ammonia water. The hydrosulphite was allowed to stand in a stoppered flask and the clear solution pipetted off as needed.) The precipitate was collected in a Gooch crucible, washed, dried in an oven at 100° and weighed as metallic bismuth. The results follow in Table I.

TABLE I.

	Lot 3.	Lot 4.
Per cent Bi	72.60	73.12
	72.73	72.80
	72.82	73.46
	72.85	73.98
	72.65	73.74
Average	72.72	73.70

(*b*) *Precipitation as Bi_2S_3 from Acid Solution.*—This method is a modification of that used by Warren[2] in the determination of bismuth. Warren precipitated bismuth sulphide from alkaline solution, ammonia being used to bring the substances into solution. We attempted to precipitate bismuth sulphide from alkaline solution but the values were two or three per cent higher than those obtained by the hydrosulphite method and varied widely among themselves. In order to test the method we precipitated the bismuth in alkaline solution, and then filtered, washed and weighed the bismuth sulphide obtained. A sample from Lot 5 was used. We got 75.00 per cent when the results were calculated to bismuth. This precipitate was then dissolved in acid, the solution made alkaline with ammonium hydroxide and then slightly acid with hydrochloric acid and the bismuth precipitated with hydrogen sulphide in acid solution. We obtained 73.26 per cent bismuth, which is in excellent agreement with the average value of 73.24 per cent obtained by the acid-sulphite method (see Table II).

We then made a number of determinations by precipitation as bismuth sulphide from acid solution.

Procedure.—About 0.5 Gm. of the compound was accurately weighed, dissolved in water and diluted to 25 cc. Hydrochloric acid was added until the precipitate which first formed on the addition of the acid had dissolved. About 3 cc. of concentrated hydrochloric acid were then added and hydrogen sulphide passed into the solution under pressure until a clear supernatant solution showed that all the bismuth had been precipitated. The precipitate was collected in a weighed Gooch crucible, the filtrate being tested for any unprecipitated bismuth. The precipitate was washed with water, alcohol, ether, carbon bisulphide, alcohol, ether in the order named. The precipitate was dried in an oven at 100° and weighed as Bi_2S_3. The results were calculated to per cent bismuth and are given in Table II.

[1] *Loc. cit.*

[2] *Loc. cit.*

TABLE II.

	Lot 3.	Lot 4.	Lot 5.
Per cent Bi	72.16	72.63	73.26
	72.87	72.63	73.30
	...	...	73.27
	...	...	73.13
Average	72.51	72.63	73.24

The values in Table II are seen to be in fair agreement with those obtained by the hydrosulphite method and given in Table I.

In addition to the above methods we attempted to determine the bismuth content by the electrolytic method but never succeeded in getting all the bismuth out of the solution.

Determination of Tartaric Acid.—The method used for the determination of tartaric acid was a modification of that used by Warren.[1]

Procedure.—The filtrate from the bismuth sulphide was made neutral and the solution evaporated to half its volume, then placed in a graduated flask and made up to volume. Half of this solution was evaporated to 25 cc. (The other half was reserved for the sodium determination), an excess of potassium chloride was added followed by 2–3 cc. of glacial acetic acid. About 100 cc. of 95 per cent alcohol was then added and the solution allowed to stand for two or three days. The potassium bitartrate was then collected in a Gooch crucible and washed with 95 per cent alcohol until free from acetic acid. The contents of the crucible were placed in a beaker containing hot water and the acidity determined by titrating with standard sodium hydroxide, using phenolphthalein as indicator. The results obtained were calculated to tartaric acid. The results follow:

TABLE III.

	Lot 3.	Lot 4.	Lot 5.
Per cent $H_2C_4H_4O_6$	14.40	14.38	13.42
	14.40	...	13.47
Average	14.40	14.38	13.45

In his determination for tartaric acid Warren used 50 per cent alcohol instead of 95 per cent alcohol. When we attempted the analysis using 50 per cent alcohol our results were very discordant, which is not surprising when one compares the solubility of potassium bitartrate in 50 per cent alcohol with its solubility in 95 per cent alcohol. The solubility at 25° C. is given in Seidell's "Solubilities" as 0.064 Gm. per 100 Gm. of solvent for 50 per cent alcohol and 0.012 Gm. per 100 Gm. of solvent for 95 per cent alcohol.

In order to allow for the solubility of potassium bitartrate in the alcohol used we ran a series of four determinations for tartaric acid on solutions of known strength. The amounts of tartaric acid used were the same as found in the analysis of sodium-bismuth tartrate and the experimental conditions were also the same as those present when sodium-bismuth tartrate was analysed for tartaric acid. We found that the value of the tartaric acid should be raised by 6.06 per cent in order to give

[1] *Loc. cit.*

nearer the true per cent of tartaric acid in the compound. This amount is something less than would be the case if we calculated the amount dissolved in the alcohol from Seidell's solubility data, which is to be expected as it is hardly likely that the alcohol we used ever became completely saturated.

TABLE IV.

$H_2C_4H_4O_6$ (taken)	0.04287	0.04287	0.04287	0.04287 Gm.
$H_2C_4H_4O_6$ (found)	0.04046	0.04037	0.04066	0.04018 Gm.

The average for all tartaric acid determinations made was 14.07 per cent which when corrected for solubility becomes 14.92 per cent.

Determination of Sodium.—In the determination of sodium we employed the method used by Warren[1] in the analysis of complex bismuth tartrates.

Procedure.—One-half of the diluted filtrate from the bismuth determination was evaporated to dryness in the presence of an excess of sulphuric acid, the residue heated to dull redness, a fragment of ammonium carbonate added and the residue again heated. The sodium sulphate was weighed, its sulphate content determined as barium sulphate in the usual way and the relative proportions of potassium and sodium calculated by the method described in Fales' "Inorganic Chemical Analysis" (Century Co.), pages 202–203.

Two determinations on Lot 5 by this method gave results as follows:

TABLE V.

Per cent Na	2.84	2.84
Per cent K	0.63	0.63

Inasmuch as no potassium was used in the preparation of the sodium-bismuth tartrate and due to the fact that the samples were small, we assumed that the potassium found was within the error of calculation by the method of mixtures described. The other determinations were calculated as sodium from the weights of sodium sulphate found. The results follow in Table VI.

TABLE VI.

	Lot 3.	Lot 4.	Lot 5.
Per cent Na	2.94	2.46	3.03
	3.08	2.58	3.34
	3.08	2.70	2.81
	2.96	2.70	2.86
	2.97	...	2.87
Average	3.01	2.61	2.98

Carbon Dioxide.—In the preparation of the sodium-bismuth tartrate under investigation, Kober used an excess of sodium hydroxide. This being the case one would expect to find a certain amount of normal carbonate or bicarbonate in the compound which would correspond to the excess of sodium hydroxide. We therefore made direct determinations for carbon dioxide contained in carbonates by the usual method of adding acid, absorbing the carbon dioxide evolved in "Ascarite" and weighing. The results obtained are given in Table VII.

[1] *Loc. cit.*

TABLE VII.

	Lot 3.	Lot 4.	Lot 5.
Per cent CO_2	0.41	0.30	0.64
	0.52	0.28	0.40
	...	0.30	0.49
	...	...	0.55
Average	0.47	0.29	0.52

In order to check some of our other results we then calculated the amounts of normal sodium carbonate and sodium bicarbonate that would correspond to this per cent of carbon dioxide. We then calculated the amount of sodium that would be equivalent to the normal carbonate assuming that the normal carbonate was the form which would most likely be present. These calculations are recorded in Table VIII.

TABLE VIII.

	Lot 3.	Lot 4.	Lot 5.
Per cent carbon dioxide	0.47	0.29	0.52
Corresponds to Na_2CO_3	0.83	0.51	0.91
Corresponds to $NaHCO_3$	0.66	0.41	0.73
Corresponds to Na	0.36	0.22	0.40

The values calculated above for sodium will be applied as corrections in the case of the sodium determinations given in the previous section.

Carbon and Hydrogen.—The method used to determine carbon and hydrogen was the usual combustion analysis employed in organic chemistry, the per cent carbon being calculated from the weight of carbon dioxide evolved and the per cent of hydrogen being calculated from the weight of the water formed. The results are given in Table IX.

TABLE IX.

	Lot 3.	Lot 4.
Per cent carbon	5.56	5.29
	4.49	5.21
Average	5.02	5.25
Per cent hydrogen	0.29	0.83
	0.44	0.81
Average	0.36	0.82

Titrations for normal carbonate and bicarbonate were attempted but were unsuccessful as the substance hydrolyzed on adding acid.

Loss of Weight on Heating.—In order to determine the water of hydration the following procedure was adopted:

Procedure.—One-Gm. samples of the sodium-bismuth tartrate were placed in weighed dishes and heated in an oven at 100° C. for a period of two hours. After being heated the dishes containing the samples were placed in a desiccator over calcium chloride and allowed to remain for thirty minutes. The dishes were then weighed again and the process repeated until successive weighings showed constant weight. The loss in weight was calculated as percentage of the original weight. The results are summarized in Table X.

TABLE X.

	Lot 3.	Lot 4.	Lot 5.
Per cent loss in weight at 100° C.	3.97	4.31	3.47
	4.61	...	3.30
	3.69	...	3.42
	3.76	...	...
	3.98	...	...
	4.16	...	...
Average	4.04	4.31	3.40

While heating the samples in order to determine the water of hydration it was noticed that the color changed to a reddish brown or buff. This, together with the fact that the values did not agree among themselves, led us to suspect that there must be decomposition of the compound. In order to verify this we decided to determine the loss in weight at different temperatures and see if on plotting loss in weight against temperature the curve would show any sharp break, indicative of a definite hydrate. As can be seen from the curve, there is apparently no definite hydrate, and we therefore conclude that the loss in weight was due to decomposition and loss of adsorbed water. The values obtained for loss in weight of Lot 3 at various temperatures are given in Table XI.

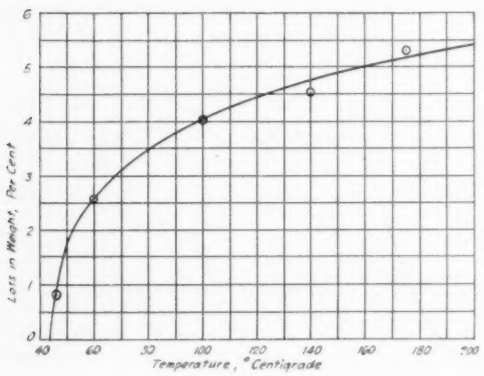

Fig. 1.

TABLE XI.

Temperature, ° C.	Loss in weight (per cent).
46	0.81
60	2.61
100	4.04
140	4.56
175	5.36

On heating the compound at 100° or above the color changes from white to a reddish brown or buff. This color is faintly evident at 60° but no change in color was noticed at 46°. This would seem to indicate that the compound does not begin to decompose to any appreciable extent until the temperature is above 60°. Inasmuch as the loss in weight at 46° is 0.81 per cent and the loss in weight at 60° is 2.61 per cent, it seems to us that the loss in weight below 50° may well be ascribed to adsorbed water which would amount to at least one per cent.

It might also be noted that there is a marked decrease in solubility when the compound is heated to 100° or above, further indicating chemical decomposition.

GENERAL DISCUSSION.

For convenience in discussing the results and making comparisons with the theoretical formulas that have been suggested, we have prepared the table below

which shows the theoretical compositions of the substance based on the formula of Rosenheim and Vogelsang for sodium-tri-bismuth tartrate and the formula suggested by Kober for sodium-tetra-bismuth tartrate. This summary is presented in Table XII.

TABLE XII.

	Experimental. Lot 3.	Lot 4.	Lot 5.	Average of Lots 3, 4 & 5.	Theory for anhydrous tetra-Bi.	Theory for anhydrous tri-Bi.
Bismuth	72.61	72.64	73.24	72.84	76.97	74.29
Sodium, corrected for Na_2CO_3	2.65	2.39	2.58	2.54	2.12	2.73
Tartaric acid, corrected for solubility	15.27	15.25	14.26	14.93	13.81	17.80
Carbon	5.02	5.25	...	5.14	4.42	5.69
Na_2CO_3 calc. on basis of CO_2	0.83	0.51	0.92	...	...	...
$NaHCO_3$ calc., on basis of CO_2	0.66	0.41	0.73	...	...	...
Extra sodium in Na_2CO_3	0.36	0.22	0.40	...	...	...

The bismuth content of the sodium-bismuth tartrate was found to be 72.84 per cent (average of Lots 3, 4 and 5). The theoretical per cent of bismuth for the anhydrous tetra-bismuth compound is 76.97 and that for the anhydrous tri-bismuth compound is 74.29. It may be noted that the per cent of bismuth increases with the sample numbers. The samples used in this investigation are numbered in the order of preparation. There is apparently an increase in purity of the product as skill and experience are obtained in the preparation. This should easily account for the higher bismuth content found in Lot 5.

The results obtained from the carbon dioxide determinations indicate that about one per cent of the weight must be due to the presence of sodium carbonate or bicarbonate. In addition, the curve relating loss in weight with increase in temperature would seem to indicate that at least one or two per cent of the weight is due to adsorbed water. This being the case, we see that the per cent of bismuth would be in excess of that required for pure sodium-tri-bismuth tartrate.

TABLE XIII.

RATIO OF BISMUTH TO TARTARIC ACID.

	Found.	Theory for tetra-Bi.	Theory for tri-Bi.
Lot 3	4.77	5.57	4.18
Lot 4	4.77	...	...
Lot 5	5.15	...	...

The analysis for tartaric acid gave a value of 14.93 per cent (corrected for solubility) as an average for the three lots, as compared with the theoretical value of 17.80 per cent for the anhydrous tri-bismuth tartrate. The value for the bismuth content of Sample 5 was *higher* than that for Samples 3 and 4. The per cent tartaric acid for Sample 5 was *less* than that for Samples 3 and 4. This is in keeping with the assumption that Lot 5 is purer than the others and should approach more nearly the theoretical values for the tetra-bismuth compound, if it is the tetra-bismuth compound. On the other hand, if it were a tri-bismuth compound the values should approach the theoretical values for the tri-bismuth compound as a limit. It will

be seen that the values for tartaric acid are much below that required by tri-bismuth tartrate and they approach that required for the tetra-bismuth tartrate as the purity increases. For the purpose of comparison we have listed (Table XIII) values for the ratio of the per cent bismuth to the per cent tartaric acid.

It is evident that in every case the ratio of bismuth to tartaric acid is too great to be explained on the assumption that the compound is anything less than a tetra-bismuth tartrate. If one assumes that the tri-bismuth compound is anhydrous and absolutely pure, the ratio is still smaller than the observed ratio. Furthermore, it has been shown that the samples with which we worked must not have been over ninety-eight per cent pure. The value for Lot 5, which is presumably the purest of the three, agrees even more closely with the theoretical ratio for tetra-bismuth tartrate. We take this as evidence in favor of a sodium tetra-bismuth tartrate.

The value for sodium was found to be 2.54 per cent as an average for the three samples, after a correction had been applied to take into account the excess of sodium present in the form of carbonate. This value is seen to be below the theoretical value of 2.73 for tri-bismuth tartrate and above the value of 2.12 for the tetra-bismuth tartrate. We are inclined to believe that the values for sodium are too high rather than too low and regard the sodium determinations as indicative of a sodium tetra-bismuth tartrate.

The determinations for carbon also bear out the contention of Kober that the compound is a sodium tetra-bismuth tartrate. The average value obtained for Lots 3 and 4 experimentally gives us a value of 5.14 per cent. The theoretical value for tri-bismuth tartrate is 5.69 per cent, while the theoretical value for tetra-bismuth tartrate is 4.42 per cent. This value for carbon also checks the value for tartaric acid very well.

The calculations of the Na_2CO_3 and the extra sodium have already been explained elsewhere.

On making determinations for water of hydration by heating to constant weight we were never able to get concordant results. Also the color of the compound changed, thus indicating chemical decomposition. On making determinations at different temperatures and drawing a curve of temperature against per cent loss in weight we got a smooth curve with no break and hence no indication of a definite hydrate. We came to the conclusion that one might reasonably assume that the loss in weight was due to adsorbed moisture amounting to from 1.0 to 1.5 per cent and to loss by chemical decomposition of the compound. At any rate, the compound does not seem to be a hydrate.

CONCLUSIONS.

The samples of sodium-bismuth tartrate examined proved to be very soluble in cold water and apparently hydrolyzed at temperatures above seventy degrees. Therefore the compound could not have been the same as prepared by Rosenheim and Vogelsang which was prepared at 100°.

The per cent bismuth approaches the theoretical value for sodium-tetra-bismuth tartrate when calculated to the dry basis and sodium carbonate free.

The per cent tartaric acid agrees more closely with the theoretical value for sodium-tetra-bismuth tartrate than with the theoretical value for sodium-tri-bismuth tartrate.

The ratio between the per cent bismuth and the per cent tartaric acid indicates that the compound is sodium-tetra-bismuth tartrate.

The per cent sodium agrees more closely with the value for sodium-tetra-bismuth tartrate than with the value for sodium-tri-bismuth tartrate.

The loss in weight at various temperatures indicates that the compound may contain as much as 1.0 to 1.5 per cent of adsorbed water, but loss in weight at the higher temperatures seems mainly due to chemical decomposition.

The determinations for carbon dioxide indicate that the compound contains about one per cent of sodium carbonate or bicarbonate.

SUMMARY.

A study has been made of the composition of a sodium-bismuth tartrate prepared by the method of Kober. Indications are that the compound is a sodium-tetra-bismuth tartrate.

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LACTIC ACID TESTS.

BY H. V. ARNY AND MARGUERITE C. DIMLER.*[1]

While lactic acid has been the subject of much work by food analysts and physiological chemists, the literature of pharmacy has furnished very few papers on tests for this acid. This is undoubtedly largely due to the fact that the average market prices of lactic acid have run somewhat higher than citric and tartaric acids and that there has been no temptation to use it as a substitute for the popular fruit acids or preparations containing them. On the other hand, there was at least one period during the past decade when the potential sources of lactic acid were more available to American users than were those of the fruit acids; in fact, it seems probable that larger supplies of and lower prices for lactic acid would prevail should a more pressing demand be created.

In view of this possibility, tests for lactic acid in the presence of other organic acids are desirable and requests for the study of this problem were made a few years since by the U. S. P. Committee on Revision (*a*). One answer to this request came from Germuth and it is his procedure upon which we began our studies. Finding the Germuth test insufficient for all circumstances, we proceeded to an examination of the literature and to a checking up of the testing methods suggested. This paper reports our findings.

The lactic tests found in the literature may be grouped as follows:

A. Thiocyanate Tests.—These tests, reported on by Mendelsohn (*b*) and by Germuth (*c*) are based upon the red coloration produced with a strongly acidulated (HCl) solution of potassium thiocyanate when lactic acid is present. Of course, a similar red color is produced when even traces of iron are present, and this Germuth not only recognizes but also provides for in his method by directing that the red

* This paper represents part of the work performed by the authors under a grant from the Research Fund of the U. S. P. Revision Committee.

[1] Scientific Section, A. PH. A., Portland meeting, 1928.

color should not be discharged upon the addition of a saturated solution of mercuric chloride. The addition of this mercuric reagent discharges the color of the ferric thiocyanate but does not affect the color produced by lactic acid. We can confirm the importance of this phase of the Germuth Test and can recommend the test if strong lactic acid or commercial calcium lactate are under examination. However, when the test is intended for the detection of lactic acid as an impurity or adulterant in pharmaceuticals (*e. g.*, Solution of Magnesium Citrate), the test does not measure up to the requirements of the case and that for following reasons:

1. Solution of Magnesium Citrate and similar pharmaceuticals almost invariably contain appreciable traces of ferric salts.

2. In the average lactic concentration of such a pharmaceutical, the amount of saturated solution of mercuric chloride required to discharge the color of the ferric salt will also cause a fading by dilution of the lactic color reaction.

An interesting side light upon this thiocyanate reaction is the fact that when the saturated solution of mercuric chloride is added for bleaching purposes, a precipitate is invariably produced in the case of lactates and not so likely to be formed in the cases of citrates and tartrates. This precipitate (mercuric lactate?) we studied in an endeavor to utilize it in our lactic test, but failed to obtain satisfactory results.

B. Oxidation Tests.—A number of tests are found in the literature in which lactic acid is oxidized with permanganate or with chromic mixture to acetaldehyde or other oxidation products, which are then detected by the usual color reactions. Among these tests may be cited those suggested by Schoorl (*d*); Thomas (*e*); Scebezenyi (*f*) and Pittarelli (*g*).

We checked up these tests but cannot recommend them. Again we were confronted by the fact that the pharmaceuticals for which the lactic acid test might be applied were apt to contain citric or tartaric acids and that these acids under similar oxidizing treatment yield aldehyde.

C. Barium Lactate Tests.—These tests depend upon the formation of barium lactate which is soluble both in water and in strong alcohol; thereby permitting the separation of lactic acid from the insoluble barium salts of a number of other organic acids. Such tests have been suggested by Muller (*h*); Kunz (*i*); Möslinger (*j*); Legler (*k*) and Trummer (*l*).

We tried out the Möslinger method on Solution of Magnesium Citrate in the following modified form:

> To 10 cc. of the citrate solution, we added barium hydroxide, barium chloride, again some barium hydroxide and lastly 50 cc. of 95 per cent alcohol. The mixture was allowed to stand a few minutes and then filtered. The alcoholic filtrate (containing the barium lactate) was evaporated to dryness, the residue was treated with 10 cc. of 10 per cent sulphuric acid and the resulting barium sulphate was filtered off. The filtered solution of lactic acid was shaken out several times with 20-cc. portions of ether and the mixed ethereal extracts were evaporated at 90° C. When lactic acid had been added to the original citrate solution, a syrupy residue was here obtained. This residue when dissolved in water was submitted to the resorcinol-sulphuric acid color test for lactic acid.

This method, in our hands, gave accurate results. It was, however, too time-consuming for application in a pharmacopœial test.

D. Insoluble Lactate Tests.—According to Fresenius' "Qualitative Analysis" basic stannous lactate is insoluble in water; zinc lactate occurs in crystals that are sparingly soluble; while lead lactate is almost insoluble.

Lactic acid tests based upon separation of the zinc salt have been suggested by Palm (*m*); Buchner and Meisenheimer (*n*); and Suzukii and Hart (*o*). An assay as lead lactate was devised by Palm (*p*). As this lead precipitation has been condemned by later investigators, we did nothing with it, but we attempted separations of lactic acid by means of its zinc and tin salts, without, however, very great success.

E. Distillation Methods.—Textbooks and investigators suggest the possibility of distillation of lactic acid from tartaric and citric acids by use of a current of superheated steam. According to Partheil and Hübner (*q*) the separation can be accomplished at 130° C. In our experiments we were unable to obtain satisfactory results by this method. We also attempted a separation by the formation of ethyl lactate and distillation of the resultant product. This also failed to produce satisfactory results.

F. Miscellaneous Tests.—In our search of the literature, we ran across a number of tests for lactic acid that did not fall into any of the five groups given above. Among these we may cite the tests suggested by Crouer and Cronheim (*r*) based upon the formation of iodoform; by Nelson (*s*), a modification of the Kunz Test (*i*) with the final identification of acid as quinine lactate; and finally by Grüss (*t*), a microchemical test based upon the formation and study of cobalt lactate crystals. None of these methods seemed sufficiently practical for our purposes to justify extended work along the lines suggested.

G. Solvent Extraction and Color Tests.—Obviously a large number of investigators have endeavored to separate lactic acid from other organic acids by use of immiscible solvents. This method has been hindered by the fact that chloroform and ether exert but little solvent upon lactic acid especially in diluted solution.

On the other hand we agree with the findings of Ohlsson (*u*) that ethyl acetate is a satisfactory extraction solvent for lactic acid. Once the acid is separated in fairly pure form, the most practical type of test would be one of the several color reactions that have been suggested for the acid. Among these we may cite:

Fletcher and Hopkins (*v*)	Lactic acid plus sulphuric acid plus copper sulphate plus thiophene; cherry red.
Brauer (*w*)	Lactic acid plus resorcinol plus sulphuric acid; red.
Hartwig and Saar (*x*)	Lactic acid plus sulphuric acid plus guaiacol; red.
Ekkert (*y*)	Lactic acid plus sulphuric acid plus pyrocatechol; blood red.
Desche (*z*)	Lactic acid plus carbazol plus sulphuric acid.

Of these, the resorcinol test of Brauer was found to be the most satisfactory to use and by combining extraction with ethyl acetate and application of the resorcinol test to the extract we devised the following satisfactory test for lactic acid in pharmaceuticals:

The preparation (in our work, 25 cc. of Solution of Magnesium Citrate) is shaken out with 20 cc. of pure ethyl acetate. When separation occurs, the lower aqueous layer is drawn off, the ethyl acetate solution is left in the separator until any water that was not removed in the first separation settles out, when it is drawn off. The aqueous fluid may, of course, be shaken out

with two other portions of ethyl acetate if deemed advisable. The mixed ethyl acetate extract is washed first with 5 cc. of distilled water and then 5 cc. of diluted sulphuric acid. The washed ethereal solution is then filtered through a dry filter paper and is evaporated on a water-bath until the ethyl acetate has completely dissipated. If a syrupy residue remains it may be weighed as lactic acid. If the test is merely qualitative, the residue is dissolved in 5 cc. of a one per cent resorcinol solution and this solution is layered upon 5 cc. of concentrated sulphuric acid. If the mixture, upon standing for two minutes, followed by gentle rotation, shows a red color, the presence of lactic acid is indicated.

In conclusion we may state that ethyl acetate is the only solvent that we have used which removes the lactic acid without taking with it traces of sugar, citric acid or tartaric acid. Even then, the careful washing of the ethyl acetate extract is essential since these three substances may be mechanically carried over with the ethyl acetate unless the latter is carefully washed. These three substances must be completely removed, otherwise they interfere with the resorcinol test.

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M. Calixte Crinon, who died March 17th, at the age of ninety, at his home in Paris, was known as the "Grand Old Man" of French pharmacy. Aside from being active in pharmacy until a few years before his death, he edited the *Repertoire de Pharmacie* from 1889–1927. In 1903, he was chosen president of the Pharmacie Centrale and, in 1906, president of the Paris Society of Pharmacy; he was also archivist of the Syndicat des Pharmaciens de la Seine. He took a keen interest in the scientific side of pharmacy and was untiring in the cause of the retail pharmacist.

A STUDY OF THE EMULSIFYING PROPERTIES OF CERTAIN SALTS OF ARABIC ACID.*

BY JOHN C. KRANTZ, JR., AND NEIL E. GORDON.

INTRODUCTION.

The work of Harkins (1) and Langmuir (2) on the structure of liquid surfaces at a liquid-liquid interface, and the orientation theory of emulsions and emulsification, has been the object of much investigation and experimental work. Newman (3), working with Bancroft in 1914, records the observation that when a hydrocarbon, such as benzene and water are emulsified, using sodium oleate as an emulsifying agent, the hydrocarbon was emulsified in the water, the latter serving as the external phase. When, however, the oleic acid salts of metals with higher valence were employed, the water became dispersed through the benzene, and this hydrocarbon became the continuous phase. The theoretical deduction of Harkins upon the nature of emulsifying agents substantiates this observation of Bancroft and Newman. Harkins and his co-workers have proposed a theory regarding the stability of dispersed particles in an emulsion. It is their claim that this is accomplished by the orientation of the molecules at the interface with a medium of dispersion. An emulsifying agent, in light of Harkins' theory, should have a polar group in the molecule, and also a group of lesser polarity. The alkali salts of fatty acids, such as oleic acid, meets this requirement. The alkali metal serving as the polar group, and the hydrocarbon chain serving as the group of lesser polarity or the non-polar group. The emulsifying agent tends to reduce the abruptness of the transition between two liquids, and forms a film over the emulsified particles, which film, according to Harkins, must fit the curvature of the emulsified particle. Accordingly, sodium oleate reduces the free energy between benzene or an oil and water, and thus induces the emulsification of the benzene or oil-in-water, whereas, with magnesium oleate, the film of the emulsifying agent fits better the water particle, and this becomes dispersed through either the benzene or oil, which forms the outer phase of the emulsion.

In pharmacy, acacia and tragacanth are the most generally used emulsifying agents. Each of these substances produces emulsions of the oil-in-water type with a reasonable degree of stability. The general treatises on Chemistry refer to acacia as the potassium, magnesium and calcium salts of arabic acid. The following formulas have been assigned to the compound, arabic acid.

$2(C_6H_{10}O_5)H_2O$ (4) $C_{12}H_{22}O_{11}$ (5), (7) $C_5H_{10}O_{11}$ (6)

The structure of arabic acid is not definitely known, and the following references have been filed in the literature to work done on the structure of this compound. Beilstein gives the empirical formula for the acid, which has been dried at 100° C., $C_{18}H_{18}O_9$?. Neubauer (8) prepared the calcium and potassium salts, and found them to have the following compositions $CaO.2C_{12}H_{20}O_{10}$ $K_2O.(C_{12}H_{22}O_{11})_3$?. Heckmeyer (9) found the lead, copper and barium salts to have the following compositions $2PbO.3C_{12}H_{20}O_{10}$, $CuO.C_{12}H_{20}O_{10}.C_{12}H_{22}O_{11}$, $BaO.2C_{12}H_{20}O_{10}$. O'Sullivan (10) prepared the calcium and barium salts of the acid which he analyzed and as-

* Scientific Section, A. PH. A., Portland meeting, 1928.

signed to them the following formulas $C_{89}H_{142}O_{74}.Ca$ and $C_{89}H_{142}O_{74}.Ba$. By hydrolyzing arabic acid with diluted sulphuric acid, the same investigator obtained a series of acids having 23 to 71 carbon atoms in the molecule. Bechamp (11) obtained the di- and tetra-nitro substitution products of arabic acid by treating gum arabic with hot nitric acid. These compounds were amorphous and assigned the compositions $C_{12}H_{18}(NO_2)_2O_{10}$? and $C_{12}H_{16}(NO_2)_4O_{10}$?, respectively. Likewise the same investigator succeeded in acetylizing the gum with acetic anhydride at 105° C. and obtained an amorphous insoluble compound of the composition $C_{21}H_{16}(C_2H_3O)_4O_{10}$?.

This summary indicates that little is known about the structure of arabic acid, but from the work that has been done, the compound seems to be similar to familiar carbohydrates in structure or the carboxylic acids obtained by mild oxidation of the carbohydrates.

Recent work done on the structure of tragacanth by Sullivan (12) suggests this gum to be the calcium salt of bassoric acid to which this investigator has assigned the formula $H.C_{24}H_{34}O_{20}.H_2O$.

With the experiences of Harkins and Newman in mind, with the oleates of sodium and magnesium as emulsifying agents, it occurred to the authors that it would be interesting to investigate the emulsifying properties of salts of arabic acid and bassoric acid, in order to determine the effect of a univalent or divalent metal combined with the acid as far as the character of the emulsion produced is concerned. The oleates of sodium and magnesium contained by one polar group in the molecule, namely, the metallic atom present, whereas, the sodium and magnesium salts of arabic or bassoric acids contain the polar metallic atom in addition to the polar hydroxyl groups which has been indicated to be present in their structure by view of their union with acetic anhydride and nitric acid.

EXPERIMENTAL.

Materials.

1. Arabic Acid.—This compound was obtained by slightly acidifying a solution of acacia in water with hydrochloric acid, dialyzing to remove soluble chlorides and precipitating the arabic acid from its aqueous solution by means of alcohol. Merck's Arabin was also employed.

2. Magnesium Arabate.—The compound was prepared by boiling a solution of arabic acid in water with an excess of magnesium carbonate, filtering and evaporating the filtrate to dryness over a water-bath.

Upon ignition the compound yielded 2.4 per cent of magnesium oxide.

3. Sodium Arabate.—The calcium present in a solution of acacia in water was precipitated by the addition of sodium carbonate and the solution brought to the neutral point. The filtrate was evaporated to dryness over a water bath.

4. Ferric Arabate.—A 20 per cent solution of acacia in water was treated with ferric chloride solution, added drop by drop until a gel was obtained of uniform reddish brown color and a stiff consistency. The iron (Fe) content of the gel was determined by treatment with hydrochloric acid and potassium iodide in the usual manner and titrating the liberated iodine with sodium thiosulphate solution. The gel contained 0.39 per cent of iron.

5. Lead Arabate.—A solution of acacia in water was treated with a solution

of lead subacetate $Pb(CH_3COO)_2$ (equivalent to 18 per cent of metallic lead), as long as precipitation occurred. The precipitate was washed free of soluble lead salts and dried to a constant weight at 100° C. The lead content was determined by dissolving about one Gm. of the lead arabate in diluted nitric acid and precipitating the lead as carbonate by means of sodium carbonate, washing, filtering and igniting, weighing the lead as the monoxide. The compound contained 40.25 per cent PbO.

6. Sodium Valerate.—Obtained by neutralizing valeric acid with sodium bicarbonate and evaporating the solution to the crystallizing point.

7. Magnesium Valerate.—Prepared by dissolving magnesium borings (for Grignard reaction) in a mixture of valeric acid and water. After the reaction was complete the solution was evaporated to the crystallizing point.

8. Zinc and Ammonium Valerates.—These compounds were used from a supply of the salts of medicinal purity in this laboratory.

9. Calcium Gluconate (14).

10. Cadmium i-Galactonate (15).

11. Magnesium Dioxystearate (16).

12. The acacia and tragacanth employed met the requirements prescribed by the United States Pharmacopœia for these substances.

13. The mineral oil employed was the commercial "Nujol" and the cottonseed and olive oils met the requirements of the United States Pharmacopœia. Distilled water p_H 5.8 to 6.4 was employed.

CERTAIN OLEATES AS EMULSIFYING AGENTS.

Using mineral oil and water as two immiscible liquids, sodium oleate, magnesium oleate, calcium oleate, manganese oleate, cobaltous oleate, nickelous oleate and aluminum oleate were employed, respectively, as emulsifying agents. Similar to the observation of Newman and Harkins with benzene, sodium oleate yielded an emulsion in which the oil was the inner phase, whereas, the emulsions prepared with the oleates of the divalent metals, and aluminum produced emulsions of the water-in-oil type.

VALERATES AS EMULSIFYING AGENTS.

The simplest possible formula assigned to arabic acid was $C_5H_{10}O_{11}$. Five carbon atoms in the molecule were selected as the starting place for study. This acid, namely, valeric acid, in the form of its sodium and ammonium salts, produced emulsions of the oil-in-water type. The procedure employed was to place one Gm. of the salt in a mortar, add 5 cc. of oil and 5 cc. of water, and triturate briskly until the mixture was homogeneous. These emulsions were not very stable and, upon standing twelve to eighteen hours, the oil and water separated. Yet upon agitation the oil was again dispersed through the water. The zinc and magnesium salts of valeric acid, used in place of the sodium and ammonium salts in the foregoing experiments, yielded emulsions of the water-in-oil type. These emulsions, like those produced with the sodium and ammonium salts, were quite unstable, and yet permitted liberal dilution with oil and no dilution with water.

ARABATES AS EMULSIFYING AGENTS.

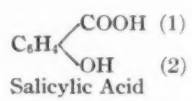
Having observed the characteristics of the emulsions prepared by certain salts of valeric acid, the next step in this investigation was to employ as emulsifying agents certain salts of arabic acid. With arabic acid sodium and magnesium arabates, emulsions of the oil-in-water type were obtained. The procedure employed was to triturate 10 cc. of the oil with 2.5 Gm. of the emulsifying agent and add in one portion 5 cc. of water. Then after brisk trituration and the formation of the emulsion, the remainder of the water was added slowly with continued trituration until 40-cc. volume was obtained. Thus in each case a 25 per cent oil-in-water emulsion was prepared. The arabic acid, iron gel, produced an emulsion of the oil-in-water type. Using 15 Gm. of the gel, 5 cc. of water and 10 cc. of oil, and briskly triturating until emulsification took place. These emulsions were stable over a period of several months. Experiments with lead arabate showed this substance to be quite incapable of producing emulsions of water-in-oil, or of oil-in-water. These experiments indicate that although the magnesium and zinc salts of valeric acid yield emulsions of the water-in-oil type, the magnesium and iron salts of arabic acid gave a normal oil-in-water emulsion.

COMPOUNDS RELATED TO ARABIC ACID AS EMULSIFYING AGENTS.

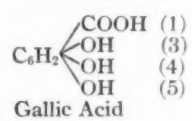
The next step in the experimental work was to select a number of acids of definite structure, having hydroxyl groups in the molecule, and to determine the nature of emulsions prepared with the di-valent salts of these acids. The salts of the following acids were employed:

$OH.CH_2(CH.OH)_4.COOH$
i-Galactonic Acid
A mixture of *d*- and *l*-galactonic acids.
$OH.CH_2(CH.OH)_4.COOH$
d-Gluconic Acid

$CH_3(CH_2)_7.CH.OH.CH.OH.(CH_2)_7.COOH$
Dihydroxystearic Acid



Salicylic Acid



Gallic Acid

Salts of Gluconic Acid.—Similar to the sodium salts of valeric acid, the sodium salt of gluconic acid produced emulsions of the oil-in-water type. Five Gm. of the compound were necessary to disperse 10 cc. of oil through 10 cc. of water, producing an emulsion which was very viscid, yet upon standing for a period of an hour, began to separate. The calcium salt of gluconic acid was treated as follows: 1 Gm. of the salt was rubbed with 5 cc. of oil, and water was added gradually with brisk trituration, 5 cc. of water in all. This procedure yielded an emulsion of the water-in-oil type, as was shown by a microscopic examination of the mixture. Changing the foregoing procedure of mixing, and employing the same emulsifying agent, namely, calcium gluconate, an emulsion of the oil-in-water type was obtained. The particles of oil emulsions were somewhat larger than those found in most emulsions of this type, and upon standing the oil and water separated, but not completely, and there remained an emulsion nucleus which was shown by the fact that upon simple agitation the emulsion was restored to its normal condition.

i-Galactonic Acid.—Similar to the sodium salt of gluconic acid the sodium salt of *i*-galactonic acid produces dispersions of oil-in-water, whereas the cadmium salt

of this compound, like the calcium salt of gluconic acid, exhibited the capacity of dispersing oil-in-water or water-in-oil.

Dioxystearic Acid.—Having observed the capacity of each of these acids to form oil-in-water and water-in-oil emulsions, the next compound prepared and studied was di-hydroxystearic acid, which has but two hydroxyl groups in a molecule containing a chain of seventeen carbon atoms. The sodium salt of di-hydroxystearic acid produced very stable emulsions of the oil-in-water type, whereas the magnesium salt of this acid produced emulsions of the water-in-oil type. Under no circumstances was it found possible to prepare emulsions with magnesium dioxystearate of the oil-in-water type. Thus the di-hydroxyl acid combined with a divalent metal behaved like a normal stearic acid salt, whereas the polyhydroxyl compounds *i*-galactonic and gluconic acids showed the property of emulsifying water-in-oil and also oil-in-water.

Salicylic Acid.—Having observed the influence of hydroxyl groups in the straight chain acids, the next step was to study the influence of the introduction of hydroxyl groups into acids containing cyclic groups. Accordingly sodium salicylate was found to produce emulsions which were unstable, but always of the oil-in-water type. Calcium salicylate, on the other hand, produced rather stable emulsions of water-in-oil, although the water particles were quite large. Employing the procedures described under the gluconic acid salts, attempts were made to prepare emulsions of the oil-in-water type, and although the particles of oil were exceedingly large and rapidly separated, there is undoubtedly some tendency on the part of calcium salicylate to form emulsions of the oil-in-water type.

Gallic Acid.—The sodium salt of gallic acid, although a poor emulsifying agent, was shown to invariably produce dispersions of the oil-in-water type. The calcium salt of gallic acid produced rather stable emulsions of the water-in-oil type and also served, to a greater degree than did calcium salicylate, to produce emulsions of the oil-in-water type. From the observations made with gluconic and *i*-galactonic acids in the form of their divalent salts, this is the behavior that might have been anticipated.

TABLE I.

SUMMARY OF RESULTS.

Emulsifying agent.	Type of emulsion. Oil-in-water.	Amphoteric properties.	Water-in-oil.
Sodium oleate	X		
Magnesium oleate			X
Calcium oleate			X
Cobaltous oleate			X
Nickelous oleate			X
Manganese oleate			X
Aluminum oleate			X
Arabic acid	X		
Sodium arabate	X		
Magnesium arabate	X		
Ferric arabate	X		
Ammonium valerate	X		
Sodium valerate	X		
Magnesium valerate			X
Zinc valerate			X
Sodium gluconate	X		
Calcium gluconate		X	
Sodium *i*-galactonate	X		
Cadmium *i*-galactonate		X	
Sodium dihydroxystearate	X		
Magnesium dihydroxystearate			X
Sodium salicylate	X		
Calcium salicylate		X	
Sodium gallate	X		
Calcium gallate		X	
Lead arabate	Did not serve as an emulsifying agent.		

THEORETICAL CONSIDERATIONS.

The results of these experiments indicate that when several hydroxyl groups are present in the molecule as exemplified in the molecule of gluconic acid, thus having two or more polar groups present in the same molecule, the divalent salts of such acids show amphoteric emulsion characteristics, that is, they produce oil-in-water or water-in-oil emulsions. With arabic acid combined with iron and magnesium, emulsions of oil-in-water were obtained. Thus, it is entirely possible that the presence of hydroxyl groups in the arabic acid molecule, in addition to the fact that there is present in acacia some univalent salts of arabic acid, are responsible for the production of oil-in-water emulsions with this compound. Likewise similar reasons could be assigned to the production of oil-in-water emulsions by tragacanth.

According to the postulates of Harkins and his associates, when the cross-section of the hydrocarbon chain of an emulsifying agent, and the metallic end of the molecule are of the same magnitude, there is little or no tendency to curvature and hence, no stable emulsion will result. With the univalent salts of these acids containing hydroxyl groups, the packing of the emulsifying agent molecules need not be altered because the polar metallic atoms, and also the polar hydroxyl groups dip into the water. When, however, these compounds are attached to a divalent metal, the hydroxyl groups so increase the magnitude of the hydrocarbon chain that there is little tendency to curvature, and the emulsions obtained are not very stable. It is probable that the presence of so many polar groups in the molecule makes the production of emulsions of oil-in-water or water-in-oil possible.

CONCLUSIONS.

1. The character of emulsions prepared with certain salts of arabic acid and certain compounds assumed to be related, has been studied.

2. An explanation for the production of oil-in-water emulsions by acacia and tragacanth has been proposed.

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THE BUFFER CAPACITIES OF ACACIA AND TRAGACANTH.*

BY JOHN C. KRANTZ, JR.

INTRODUCTION.

In a previous communication to THIS JOURNAL, Krantz and Gordon[1] reported their studies on the influence of changes of hydrogen-ion concentration upon the stability of certain oil-in-water emulsions. In this series of experiments cottonseed oil and mineral oil were emulsified in an aqueous dispersion phase, using acacia and tragacanth, respectively, as emulsifying agents. The changes in hydrogen-ion concentration were produced by adding the necessary quantities of sodium hydroxide and hydrochloric acid, respectively, to the external phase prior to the preparation of the emulsion. Following this procedure, it was observed that the most stable range of hydrogen-ion concentration for the external phase with acacia emulsions was between p_H 2 and 10.5, and with tragacanth the most stable range was between p_H 1.9 and 2.3.

It occurred to the author that it would be interesting to observe to what extent the respective gums influenced or buffered the external phase of the emulsion and that, possibly by virtue of this, the degree of stability was determined.

EXPERIMENTAL.

Accordingly, a series of cottonseed oil emulsions was prepared containing ten per cent by volume of the oil. For emulsification 2.5 Gm. of acacia were employed for 10 cc. of oil and 0.5 Gm. of tragacanth for the same volume of oil. The p_H of the external phase, prior to the preparation of the emulsion was measured electrometrically in each case.

Two days after the preparation of these emulsions, their hydrogen-ion concentrations were determined electrometrically. Table I records the results of these experiments.

TABLE I.

CHANGES IN HYDROGEN-ION CONCENTRATION IN THE EXTERNAL PHASE AFTER EMULSIFICATION OF COTTONSEED OIL.

No.	p_H of external phase.	Emulsifying agent.	p_H of emulsion.	Emulsifying agent.	p_H of emulsion.
1	0.1	Acacia	0.27	Tragacanth	0.27
2	1.07	Acacia	1.56	Tragacanth	1.37
3	2.00	Acacia	3.57	Tragacanth	2.80
4	2.9	Acacia	4.11	Tragacanth	4.22
5	3.89	Acacia	4.22	Tragacanth	4.64
6	4.64	Acacia	4.21	Tragacanth	4.50
7	5.52	Acacia	4.11	Tragacanth	4.21
8	6.97	Acacia	4.12	Tragacanth	4.49
9	8.98	Acacia	4.26	Tragacanth	4.37
10	9.86	Acacia	4.25	Tragacanth	4.80
11	10.85	Acacia	4.28	Tragacanth	9.82
12	11.74	Acacia	9.92	Tragacanth	10.93
13	12.65	Acacia	12.10	Tragacanth	12.13
14	13.53	Acacia	13.35	Tragacanth	Too gelatinous to measure

* Scientific Section, A. PH. A., Portland meeting, 1928.

[1] JOUR. A. PH. A., 15 (1926), 83.

The tragacanth emulsions were diluted with an equal volume of boiled distilled water in order to sufficiently reduce the viscosity to enable the measurement of hydrogen-ion concentration to be made.

A sample of grade "A" U. S. P. acacia was obtained and solutions of the gum prepared in aqueous solutions adjusted to a definite hydrogen-ion concentration. These solvents were prepared in the same manner as the external phase of the foregoing series of emulsions. The concentration of acacia in the solvent was the same in each solution, namely, 2.5 Gm. in 40 cc., *i. e.*, the same concentration per total

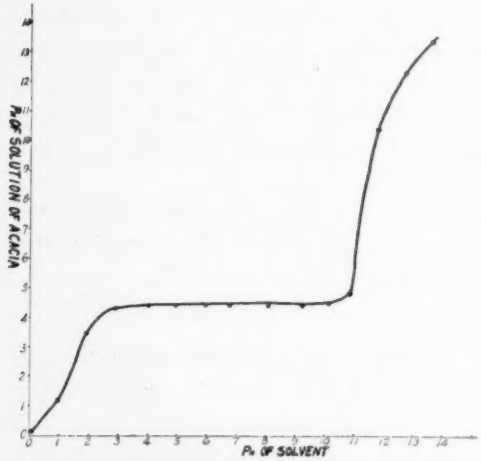

Fig. 1.—Buffer capacity of acacia solutions.

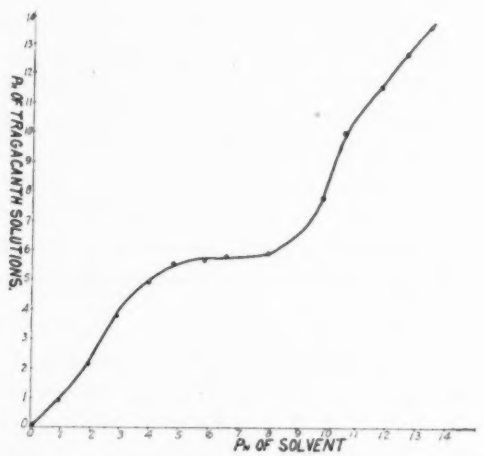

Fig. 2.—Buffer capacity of tragacanth solutions.

volume as was present in the acacia emulsions. Table II records the hydrogen-ion concentration of the solvent and of the acacia solutions.

TABLE II.

ACACIA SOLUTIONS AND THEIR HYDROGEN-ION CONCENTRATIONS.

No.	p_H of solvent.	p_H of solution.	No.	p_H of solvent.	p_H of solution.
1	0.04	0.15	9	8.07	4.51
2	0.95	1.19	10	9.20	4.50
3	1.92	3.51	11	10.13	4.52
4	2.88	4.33	12	10.82	4.89
5	4.02	4.40	13	11.85	10.46
6	4.95	4.34	14	12.74	12.47
7	6.0	4.50	15	13.56	13.51
8	6.75	4.47			

When these data are plotted with the p_H of the solvent as abscissae and the p_H of the solution as ordinates a typical neutralization curve is obtained as shown in Fig. 1.

With the gels that tragacanth forms with water, difficulty was experienced in measuring the hydrogen-ion concentration in concentrations of 0.5 Gm. in 40 cc. (the amount employed in the emulsions) on account of the great viscosity of the gels. Consequently gels were prepared containing 0.5 Gm. of tragacanth in 100 cc. of aqueous solution. These gels were sufficiently limpid to measure their hydrogen-

ion concentrations electrometrically. Table III records the hydrogen-ion concentration of the solvents and of the tragacanth gels.

TABLE III.

TRAGACANTH GELS AND THEIR HYDROGEN-ION CONCENTRATIONS.

No.	p_H of solvent.	p_H of gel.	No.	p_H of solvent.	p_H of gel.
1	0.04	0.04	8	6.48	5.88
2	0.95	0.96	9	7.86	5.82
3	1.92	2.10	10	9.75	7.70
4	2.88	3.81	11	10.47	9.99
5	3.93	4.93	12	11.85	11.50
6	4.78	5.54	13	12.74	12.68
7	5.80	5.56	14	13.56	13.55

Figure 2 represents these data; the p_H of the solvent are the abscissae and the p_H of the tragacanth gels are the ordinates.

In order to study the change of p_H caused by dilution of acacia solutions or, in other words, the buffer capacity of acacia solutions upon the addition of water, a sample of acacia was dissolved in boiled, distilled water p_H 6.05. Certain diffusion experiments[1] have indicated the molecular weight of acacia to be 1750. Using this value as the molecular weight a tenth-molar solution was prepared. The p_H of this solution and those solutions obtained by dilution of this with water p_H 6.05 are given in Table IV.

TABLE IV.

EFFECT OF DILUTION UPON THE p_H OF ACACIA SOLUTIONS.

Conc.	p_H.	Conc.	p_H.
$\frac{M}{10}$	4.03	$\frac{M}{70}$	4.56
$\frac{M}{20}$	4.16	$\frac{M}{100}$	4.69
$\frac{M}{30}$	4.35	$\frac{M}{500}$	5.07
$\frac{M}{50}$	4.44	$\frac{M}{1000}$	5.27

These data are plotted in Fig. 3. The abscissae when multiplied by ten give the mole fraction dilution of the acacia solution.

Van Slyke[2] has established a standard for the measurement of the buffer capacities of various solutions. The unit adopted by Van Slyke is the differential ratio

$$\frac{dB}{dp_H}$$

This expresses the relationship between the increment in Gm. equivalents of strong base added to the buffer solution and the resultant increment in p_H. If an acid is added the values dB and dp_H are negative, so that the ratio designated by Van

[1] E. F. Burton, "The Physical Properties of Colloidal Solutions" (1916), 122.

[2] D. D. Van Slyke, *J. Biol. Chem.*, 53 (1922), 528.

Slyke as "β" has always a positive value. A solution has a buffer capacity of unity when a liter will take up one Gm. equivalent of strong acid or strong base per unit change in p_H.

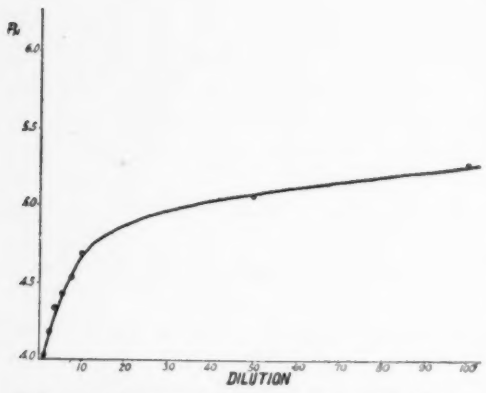

Fig. 3.—Effect of dilution upon p_H of acacia solution.

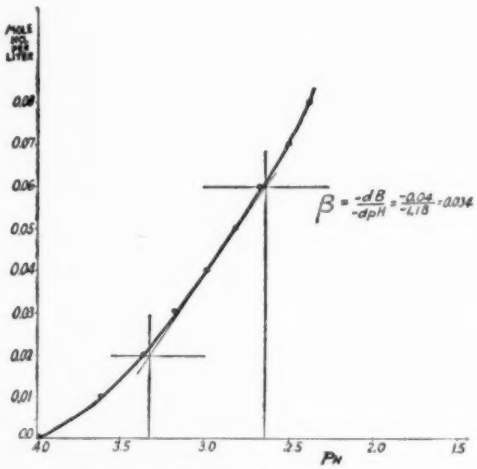

Fig. 4.—Buffer capacity of acacia.

The value of the Van Slyke "β" for a tenth-molar solution of acacia was determined by preparing 1000 cc. of acacia solution of this concentration and adding definite equivalents of tenth-normal hydrochloric acid and determining the p_H after each addition. Table V records these results.

TABLE V.

No.	Cc. 0.1 HCl added.	Mole HCl per L.	p_H.	No.	Cc. 0.1 HCl added.	Mole HCl per L.	p_H.
1	00	00	4.03	6	500	0.05	2.82
2	100	0.01	3.63	7	600	0.06	2.70
3	200	0.02	3.36	8	700	0.07	2.50
4	300	0.03	3.18	9	800	0.08	2.36
5	400	0.04	2.99				

Plotting these values as shown in Fig. 4 we may obtain the ratio $\frac{-\Delta B}{-\Delta p_H}$, where each of these values is a measurable increment. Thus, to change the p_H from 4 to 3, 0.039 mole of hydrochloric acid was added. Then

$$\frac{-\Delta B}{-\Delta p_H} = \frac{-0.039}{-1.00} = 0.039$$

To obtain the exact value of β, however, a tangent is drawn to the curve at say 0.04, the base line intercepts of this tangent at 0.06 and 0.02 are determined to be 3.32 and 2.14, respectively, then

$$\frac{-dB}{-dp_H} = \frac{-0.04}{-1.18} = 0.034 \text{ or } \beta$$

$$-dB = 0.06 - 0.02 = 0.04 \text{ and } -dp_H = 3.32 - 2.14 = 1.18$$

Thus the buffer capacity of acacia at p_H 3 is 0.034.

DISCUSSION OF RESULTS.

The correlation of the data included in this investigation with the beforementioned work of Krantz and Gordon[1] indicates that with emulsions prepared with acacia, the buffering action of acacia upon acid or alkali added to the emulsion influences the stability of the emulsion. Acacia being the potassium, calcium and magnesium salts of a weak acid, namely, arabic acid, one might expect its buffer capacity to be more effective in the neutralization of acids than the neutralization of alkalies. An examination of Fig. 1 shows this to be the case, on account of the abruptness of the curve on the alkaline side p_H 10.5 and the gradient curvature on the acid side of the p_H scale. This information agrees with the findings of Gordon and the author in the stability of emulsions prepared with acacia, *i. e.*, the instability begins on the alkaline side at a lesser concentration of alkali than it does on the acid side with a corresponding concentration of acid. The alkaline concentration, where instability begins, lies between $\frac{N}{10^3}$ and $\frac{N}{10^4}$ sodium hydroxide solution, whereas with hydrochloric acid a concentration of $\frac{N}{10^2}$ is required to produce relative instability.

Dilution with water was shown to have little influence upon the p_H of acacia solutions. The buffering effect of tragacanth does seem to play as important a rôle in the determination of emulsion-stability as it does with acacia. Gordon and the author found tragacanth emulsions prepared with an external phase of about p_H 2 to be most stable, yet tragacanth exerts a considerable buffer capacity between p_H 3.0 and 10.00. In the case of the emulsions prepared with tragacanth, the stability of the gel which the gum forms with water seems to be the main criterion of emulsion-stability. The acid gels p_H 1.5 to 2.5 were found to be most stable, as recorded in the previous investigation of Gordon and the author.

CONCLUSIONS.

1. The buffer capacities of acacia and tragacanth have been studied.
2. The effect of dilution on the p_H of acacia solutions has been determined. The Van Slyke "β" for acacia in 0.1 M solution at p_H 3 has been found to be 0.034.
3. An explanation correlating the buffer capacity of acacia and the stability of emulsions prepared with this substance has been proposed.

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ESTIMATION OF NITROGLYCERIN SOLUTION D. A. B. VI.

The conventional method of "D. A. B. VI," based on the saponification of the nitroglycerin, gives as a rule too high values. The addition of H_2O_2 does not seem advantageous, and the process is unsuitable in practice. For ordinary checking it is sufficient to estimate the dry residue of 10-Gm. solution, using a Soxhlet flask, and drying over $CaCl_2$. One can also fall back on the test of "Pharm. Netherl. V.;" 10 cc. of nitroglycerin solution are mixed with 15 cc. H_2O and warmed to just over 35° C., when a clear solution results. When carefully cooled the mixture becomes turbid between 29° and 34° C.—C. Brumming (*Apoth. Ztg.*, 43, 81, 1235; through *Pharm. J.* for March 16, 1929.

PHYTOCHEMICAL NOTES.*

NO. 103. A NEW DIHYDROTERPENE.**

BY SIMON BLANCO.

At the time Wehmer compiled his "Pflanzenstoffe" in 1911, only three species of *Pittosporum* had been subjected to partial chemical investigation, *viz.*,

Pittosporum undulatum, Ventenat, of Australia
Pittosporum resiniferum, Hemsley, P. I. and
Pittosporum pentandrum, (Blanco) Merrill, P. I.

In 1895 R. Threlfall (1) of Sydney observed the "tangerine-like" odor of the Australian fruit. A sample of the steam distilled volatile oil was sent to W. A. Tilden of London, who later turned it over to the Director of the Wellcome Chemical Research Laboratory. At the request of the latter a larger amount of fresh oil was specially distilled in Australia during December 1905 and January 1906. Power and Tutin (2) report about 4 per cent of *d*-limonene, a small amount of esters of valeric, formic and other acids, about 15 per cent of an optically active sesquiterpene (apparently a new one), palmitic acid and an undetermined phenol, in very small amount, and apparently a trace of salicylic acid. In the light of later investigations one would naturally look for *n*-heptane, but the authors do not report this hydrocarbon. Aside from the possibility that this species does not produce *n*-heptane in the fruit, its absence may be accounted for by the observations of Bacon (3).

In 1909, R. F. Bacon reported on three Philippine volatile oils obtained from *P. resiniferum* and one obtained from *P. pentandrum* (4). The first two oils were obtained by expression and subsequent distillation of the volatile constituents. The author states that the fruits are known as petroleum nuts "because of a fancied resemblance in the odor of the oil to that of petroleum" etc. He himself describes the odor of his first oil expressed from the fruit, collected in the autumn of 1907, as "orange-like." Although the lowest fraction (98–103°) "had a pleasant odor recalling oranges," he states that its properties "leave little doubt of the identity of this compound with heptane."

His second oil was prepared by expression and subsequent steam distillation from fruits collected in December 1908. The volatile oil from this "contained no heptane."

However, the oil distilled directly from fruit (not from the expressed materials), collected in December at the same place at which the fruit from which the first oil had been prepared, yielded an appreciable amount of heptane. Treated with concentrated sulphuric acid and redistilled over sodium, the odor of the heptane fraction reminded the author of diphenyl methane. He identified the *n*-heptane in this case by converting it into its primary bromide and this into the corresponding acetate.

Fraction 150–160° constituted the bulk of the oil and is pronounced as consisting of a dihydroterpene, $C_{10}H_{18}$. Its hydrochloride was converted into hexa-

* From the Laboratory of Edward Kremers.

** Part of a thesis submitted for the degree of Master of Science, University of Wisconsin, 1928.

hydrocymene by means of the Grignard reaction. The position of the double bond in the hydrocarbon, however, was not established.

The oil obtained by steam distillation of *P. pentandrum* (5) is supposed to "consist principally of the same dihydroterpene" found in *P. resiniferum*.

Pittosporum resiniferum is the third plant on record that produces heptane. This hydrocarbon was first identified in *Pinus Sabiniana* by Thorp (6) in 1879, and Schorlemmer and Thorp (7) in 1883; and in *Pinus Jeffreyi* by Sadtler (8) in 1879, also by Schorger (9) in 1913. The genesis of this unusual hydrocarbon is of special interest. A biogenetic relationship with the so-called terpenes seems out of the question. The production of heptoic aldehyde from one of the fatty acids of castor oil seemed more suggestive. Hence an attempt to study the fatty oil from the seeds of *Pinus Sabiniana* was made in 1917 (10). The amount of fatty oil obtained was insufficient, however, to study the position of the double linkage in the fatty acids. Moreover, whereas the heptane in *Pinus Sabiniana* is obtained from the trunk, the fatty oil studied had been obtained from the seed. In the *Pittosporum* fruit we have an instance where heptane and fatty oil are produced by more closely related parts of the same organ. Hence a study of the fatty acids of the fruit seemed specially desirable. This was made possible through Professor Patrocinio Valenzuela of Manila who persuaded the Bureau of Forestry of the Philippine Islands to collect fruit, pickle it in alcohol and ship the fruit thus preserved in sealed tin cans to Madison. The first lot of fruits was placed at the disposal of A. J. Schwarz, the second at that of the writer. It is, therefore, to Professor Valenzuela and to the Director of the Bureau of Forestry of the Philippine Islands that we are indebted for the opportunity to carry on the investigation here reported.

EXPERIMENTAL PART.

The volatile oil was obtained from the concentrated alcoholic extract by steam distillation. Having been shaken with water to remove traces of alcohol, it revealed the following constants:

$d_{20}^{\circ} = 0.7692$; $n_{D25}^{\circ} = 1.435$; $\alpha_{D23}^{\circ} = 20.02^{\circ}$ for 100-mm. tube and 40.03° for 200-mm. tube.

The original oil had a saponification value of 0.67, the acetylated oil one of 8.56. Elementary analysis gave the following results:

Computed for $C_{10}H_{16}O$.	Found: I.	II.	III.
C = 79.6 p. c.	80.6 p. c.	80.5 p. c.	81.3 p. c.
H = 10.5 p. c.	9.4 p. c.	9.4 p. c.	9.9 p. c.
O = 10.5 p. c.			

These figures reveal the presence of an appreciable amount of oxygenated constituents.

In all 1088 cc. of the oil were available. Inasmuch as the weight of the fresh fruit was not known the exact percentage yield could not be computed. Power and Tutin report 0.44 p. c. for *P. undulatum*. Bacon reports 0.5 p. c. for *P. resiniferum* and 0.2 p. c. for *P. pentandrum*.

The oil was fractionated three times, the last time with a 10-inch fractionation column. The results of the last fractionation, also some of the physical constants of the fractions, are herewith recorded:

Fraction amount.	Cc.	t. Deg.	$d_{25}°$.	$n_{D27}°$.	$\alpha_{D25}°$. Deg.
1	40	79–97	0.687	1.391	+3.88
2	145	97–103	0.685	1.393	+2.18
3	150	103–110	0.695	1.395	
4	112	110–120	0.714	1.406	
5	40	120–130	0.739	...	
6	29	130–140	0.883	...	
7	50	140–150	0.927	...	
8	286	150–154	0.947	1.464	+39.34
9	77	154–156	0.952	...	
Residue	20	.....	...	...	

Most of Fraction No. 8 was collected between 152–153°.

Fraction 8.—Bacon states that his fraction 158–160° after redistillation over sodium had the composition of a dihydroterpene, $C_{10}H_{18}$, from which, however, he did not succeed in preparing a crystalline derivative. An attempt to prepare a nitrosochloride according to Wallach's original method failed so far as any solid products were concerned, though the blue color of the reaction mixture indicated the addition of nitrosyl chloride. In a second attempt glacial acetic acid was avoided and absolute alcohol with gaseous hydrogen chloride used with the ethyl nitrite. Again a blue color was produced, but no solid nitrosochloride separated. In a third attempt heptane was used as solvent and gaseous NOCl was passed into the cooled solution. A slight amount of white precipitate was formed even before the reaction mixture had become appreciably blue. The precipitate was removed by filtration and more NOCl passed into the filtrate. In this manner several crops of crystals were obtained without running the risk of passing in too much NOCl. The nitrosochloride thus obtained was very unstable. While trying to dry it, the crystals liquefied to a brownish mass.

Nitrolbenzylamide.—Having learned that the nitrosochloride, even when successfully prepared, is exceedingly unstable, an attempt was made to prepare the benzylamine base from the freshly precipitated nitrosochloride collected in fractions. At first Wallach's original method was tried. When the alcoholic reaction mixture was poured on ice, an oily substance was precipitated. Shaken out with ether, the oily residue, resulting upon evaporation of the solvent, was purified on porous plate. The solid remaining, after crystallization from alcohol, melted at 148–149°.

In subsequent experiments the reaction liquid was allowed to evaporate. Mixed crystals of benzylamine hydrochloride and "dihydroterpene" nitrolbenzylamide resulted. The former were dissolved in water, the latter dried on porous plate. These melted at 146°. Recrystallized from alcohol they melted at 147–148°.

Two nitrogen determinations according to Gunning's method (11) (with salicylic acid and sodium thiosulphate) yielded 10.9 p. c. and 10.7 p. c., respectively, of N. The computed amount for $C_{10}H_{18}.NO.NH\ CH_2C_6H_5$ is 10.2 per cent.

Nitrolpiperidide.—Inasmuch as the menthene nitrosochloride cannot be dried, the equivalent amount of base can only be estimated, and that but roughly. The nitrolamine base obtained was very small in amount and that unsatisfactory. The mother liquid was therefore neutralized with sulphuric acid, the solution evaporated, the residue dried on porous plate and what was left shaken with

water to remove piperidine sulphate. The small amount that was left was again drained on porous plate. When dried, it melted at 159°. The amount was too small for even a nitrogen determination.

Attempts to prepare a crystalline nitrosomenthene from the nitrosochloride gave negative results as did also the attempt to convert any non-crystallizable nitroso menthene into menthylamine.

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(5) *Ibid.*, 118.
(6) *Jour. Chem. Soc.*, 35 (1879), 269.
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THE HANBURY MEDAL.

The proposal that "the memory of the late Daniel Hanbury should be in some way perpetuated is due to Mr. Thomas Greenish; the exact mode in which it seemed desirable that the project should be carried out is due to Professor Dragendorff. The plan is now definitely before the public. A gold medal (two, when the funds allow) is to be granted every two years for high excellence in the prosecution or promotion of original research in the natural history and chemistry of drugs."

The medal itself will be 2¼ in. in diameter, with a likeness of Daniel Hanbury on one side, and the words "Daniel Hanbury, born 1825, died 1875," and on the obverse a space for the name of the recipient within a wreath, with the words "Awarded for Original Research in the Natural History and Chemistry of Drugs."—From *Chemist and Druggist*, March 15, 1879.

A cut of the Hanbury Medal is shown on page 540.

DETERMINATION OF ALCOHOLS IN ESSENTIAL OILS.

T. G. Oberhard and N. A. Kubassow. (*Pharm. Ztg.*, 73 (1928), 839). The various mathematical formulas given in textbooks for the correction and determination of alcohols in essential oils by the acetylation and other methods are discussed and criticised in the light of experiments made with known quantities of alcohols and esters in presence of a terpene or paraffin. Ultimately the formula

$$A = \frac{M}{20} \times \frac{a}{n} \times \frac{n - 0.021 \times b}{s - 0.021 \times a}$$

is adopted as giving results nearest to the actual quantities. In this, "A" = total alcohols; "M" = molecular weight of the alcohols in question; "n" = weight of oil taken; "b" = number of cc. of semi-normal alcoholic solution of potassium hydroxide used in saponifying the esters in "n" Gm. of oil; "s" = weight of acetylized oil; "a" = the number of cc. of semi-normal alcoholic solution of potassium hydroxide used for saponifying the esters in "s" Gm. of acetylized oil. About 4 Gm. of the original oil should be weighed off for acetylizing. For menthol-containing oils the acetylizing process should be continued for at least seventy-five minutes; those containing thymol or borneol must be acetylized for at least one and three-quarter hours. The formula, when modified, can also be applied to other methods. Three tables, composed of many figures and calculations, are given, comparing the results worked by the different formulas, obtained from known weights of the various alcohols and non-alcoholic vehicles.—From *Quarterly Journal of Pharmacy*, October to December.

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VITAMINE B—ITS NATURE AND ITS WORKS.

"Although it has been more than twenty years since Professor Pekelharing, noted Dutch investigator, hazarded the opinion that there is a still unknown substance in milk, which, even in very small quantities, is of paramount importance to nourishment, the isolation of vitamines in pure form remains an unsolved problem for the research worker in the laboratory. As long ago as 1887, a commission from the Netherlands was studying beriberi, and, indeed, since that time the search for the elusive essential substance has been constant. In a recent survey of biochemical investigations of vitamine B Kruse and McCollum, of the biochemical laboratory of Johns Hopkins University, have traced the gradual development of interest in the nature of this vitamine. The demonstration of the existence of the vitamine was not accepted without a struggle. It was not until 1920, that Abderhalden agreed that there was no longer doubt of the existence of a series of nutritive elements which participate in metabolism and influence organic functions specifically. The credit for the term vitamines goes to Funk, who in 1911, separated a potent extract from rice polishings. Almost simultaneously, numerous other investigators isolated the antineuritic substances in relatively concentrated forms, and several additional terms, such as oryzanin, torulin and antiberiberin, were suggested; but the term coined by Funk has been able to capture both medical and popular fancy notwithstanding the fact that the substances are not amines. The suggestion by Drummond that the final "e" be dropped solved the difficulty of confusion with chemical nomenclature.

The U. S. P. uses the final "e;" hence for the present, the JOUR. A. PH. A. uses the "e" ending.

"Since 1911 investigations on vitamine B have been extended, so that it is apparent now that it is concerned with many other conditions besides beriberi. It has been associated, as almost every one knows, with such qualities as are attached to yeast."—*J. A. M. A.*, Feb. 16.

SAL PRUNELLA.

One of the most interesting articles in the materia medica, from the historical point of view, is potassium nitrate, and not the least interesting form in which it has been employed is sal prunella, or lapis prunellæ as it was often called. In English medicine it has been in regular use for at least three hundred years (it was official in the first London Pharmacopœia), and generally for the one purpose of treating sore mouth and throat. Its name, as indicated in the *C. & D. Compendium* (page 250), has always been something of a puzzle. It may have begun its career as "brunells," a diminutive of the medieval Latin *brunus*-brown, and have been associated with the German *Bräune*-quinsy. Dr. James says that this preparation (which by-the-way was also known under several other names) had been observed by the Germans during an epidemic of "camp fever attended with the dangerous black quinsy" to act as a cure; this particular kind of quinsy was called die *Bräune*. Gerard, more than a hundred years earlier, gives precisely the same explanation as to why the herb self-heal was called by the same name. The triangular association of the chemical, the herb, and the Germans assumes a rather different aspect at the hands of Nicholas Lemery (1698), for he states that "this preparation is called Sal or Lapis Prunellæ, either because the essential salt which is drawn from Prunella or self-heal hath the same virtue and figure as Crystal Mineral (which is another name for the fused salt-petre), or else because it is given in hot Fevers, whose heat is compared to that of a burning coal called *Pruna* (Pruna-Latin—a glowing coal). The Germans do give it the form of a Sloe, after having coloured it red with Roses." Le Febure, who was chemist to Charles II had adopted (1670) the idea that the name was used because of the drug's refrigerant properties, for, says he: "it is a Soveraign Remedy against those Feavers which are called Fievres Prunelles, or Burning Feavers, because *Prunella* in Latin signifies a Burning Coal."—*Chemist & Druggist*, March 2, 1929.

A PHARMACEUTICAL STUDY OF MAGMÆ MAGNESIÆ—1900–1930.

BY A. J. LEHMAN, M.S.

(*Concluded from p. 395, April Issue.*)

9. QUALITATIVE TESTS.

A. Description and Physical Properties.—The N. F. 1900 makes no statement relative to the appearance of the finished product. The U. S. P. 1910 states the magma is "a thick white liquid containing Magnesium Hydroxide in suspension in water," and the revision of 1920 states, "a viscous, opaque, white mixture, from which more or less water usually separates on standing; free from mustiness."

The appearance of the product is an important criterion. Pharmacists apparently have difficulty in obtaining a magma having the desired color and consistency. Boehm (83) (1908) in commenting on this states that the N. F. product is too thick to pour, also that some manufacturers add magnesium oxide to insure a white color. Posey (84) (1909) reports difficulty in obtaining a white product, as does Hensel (85) (1914). Beringer (86) (1913) suggests a possible discoloration due to impurities in the wash water.

B. Tests for Identity.—1. *Alkalinity.*—The N. F. 1900 gives no qualitative tests for Magma Magnesia. The U. S. P. 1910 and 1920 state that the Magma is alkaline to litmus and phenolphthalein. This alkalinity according to an article (87) (1911), prevents the use of gelatin as a suspending agent. The latter being more susceptible to mold growth if in an alkaline medium.

2. Test for Magnesium.—Both revisions of the U. S. P. apply the same test for "magnesium" with slightly varying technique. A precipitate of magnesium ammonium phosphate results. The reactions may be expressed as follows:

$$Mg(OH)_2 + 2HCl = MgCl_2 + 2H_2O$$
$$MgCl_2 + NH_4OH + Na_2HPO_4 = MgNH_4PO_4 + 2NaCl + H_2O$$

3. Tests for Purity.—a. Test for CO_2.—Both the revisions of the U. S. P. state that there must be no evolution of gas on the addition of 2 mils of diluted hydrochloric acid, and the resulting solution should not be more than slightly turbid. The evolution, if any, would be caused by the presence of magnesium or calcium carbonate. This seems to be one of the lesser difficulties in preparing the magma, for many preparations made in the laboratory were tested, all giving negative results. The reaction occuring may be expressed as follows:

$$MgCO_3 + 2HCl = MgCl_2 + H_2O + CO_2$$
$$CaCO_3 + 2HCl = CaCl_2 + H_2O + CO_2$$

b. Test for the Limit of Soluble Compounds.—According to the U. S. P. of 1910, 10 mils of the magma are diluted with 100 mils of distilled water and the precipitate allowed to settle. The water dissolves any soluble impurities and the residue obtained from evaporating 50 mils to dryness on a water-bath must not weigh more than 0.005 Gm. The revision of 1920 dilutes 20 cc. of the magma with 200 cc. of distilled water after which the procedure is the same as above. The 5 mg. of residue may be accounted for by a slight suspension of the $Mg(OH)_2$ or due to its slight solubility.

c. Test for Limit of Soluble Alkali.—According to the U. S. P. 1910 the residue obtained from the previous test when redissolved in water and methyl orange T. S. added, not more than 5 drops of $N/1$ H_2SO_4 shall be required to neutralize the alkalinity. The revision of 1920 required that not more than 0.4 cc. of $N/10$ H_2SO_4 shall be required to neutralize 50 cc. of the supernatant liquid obtained from the above test, using methyl orange T. S. as indicator. Any excess of this is looked upon as being sodium hydroxide. Terry (88) (1919) found that magma carefully prepared by the U. S. P. process had an alkalinity corresponding to 11.2 mils of $N/10$ H_2SO_4. He says the U. S. P. limits this to "4 mils." He suggests the foreign alkalinity be determined by titrating the supernatant liquid of a diluted magma rather than by evaporation. His method is to dilute 25 mils of magma with 175 mils of water and after shaking and settling titrate the supernatant liquid. He also suggests that a test for arsenic and for the determination of heavy metals be included, and that a portion of the magma be ignited to determine the presence of carbonizable material.

10. ASSAY.

The N. F. 1900 gives no assay for Magma Magnesia. The U. S. P. 1910 offers the following:

"Transfer about 5 Gm. of Magma Magnesia to a tared flask, stopper and weigh accurately, add 25 mils of normal sulphuric acid T. S., and after solution is complete titrate the excess of acid with normal potassium hydroxide T. S. using methyl orange T. S. as indicator. It shows an amount of magnesium hydroxide corresponding to not less than 6.5% nor more than 7.5% of the weight of Magnesia Magma taken.

"Each mil of normal sulphuric T. S. used corresponds to 0.02917 Gm. of $Mg(OH)_2$. Each Gm. of Magnesia Magma corresponds to not less than 2.23 mils nor more than 2.57 mils of normal potassium hydroxide T. S."

Sulphuric acid reacts with magnesium hydroxide to form magnesium sulphate and water as follows:

$$H_2SO_4 + Mg(OH)_2 = MgSO_4 + 2H_2O$$

Potassium hydroxide reacts with sulphuric acid to form potassium sulphate and water as follows:

$$2KOH + H_2SO_4 = K_2SO_4 + 2H_2O$$

Hence $Mg(OH)_2$ equivalent to H_2SO_4 equivalent to 2KOH
58.34 ——2000 cc. $N/1$ V. S.——2000 cc. $N/1$ V. S.
0.02917——1 cc. $N/1$ V. S.

then

$$\frac{2.23 \times 0.02917}{1} \times 100 = 6.5\%$$

$$\frac{2.57 \times 0.02917}{1} \times 100 = 7.5\%$$

The revision of 1920 offers the same method of assay, using sodium hydroxide V. S. in place of potassium hydroxide V. S.

As early as 1911, Craig (89) recognized the value of an official assay process. Hilton (90) (1911) outlines a method consisting of adding to 10 cc. of magma 30 cc.

of $N/1$ H_2SO_4 V. S. and 2 drops of phenolphthalein T. S., heating the solution and determining the excess of acid with $N/1$ KOH V. S., each cc. of $N/1$ H_2SO_4 V. S. representing 0.2897 Gm. $Mg(OH)_2$. LaWall (91) (1914) suggests that the simplest assay would be by evaporation, but this would give variable results due to the variable stages of dehydration which the product assumes as it dries. He then offers a method comparable to the present U. S. P. assay, using however, only 3 Gm. of magma, 25 cc. $N/2$ HCl V. S., $N/1$ KOH V. S. and phenolphthalein as the indicator. Terry (92) (1919) in commenting on the U. S. P. assay favors the use of phenolphthalein T. S. in place of the prescribed methyl orange T. S.

Some of the results of assay are as follows: Ėwe (93) (1913) reports samples 20% above strength as designated on label. LaWall (94) (1914) reports a range of 2.22% to 9.57% for 12 samples. Snapp (95) (1918) rejected 9 out of 13 samples. Terry (96) (1918) states that an analysis of proprietary brands showed a range of 5.21% to 9.79%. In 1920 Terry (97) reports 33 out of 62 samples meeting the U. S. P. test. The range was from 4.41 to 8.37. Miller (98) (1921) found one out of three samples below standard.

11. SUSPENDING AGENTS.

Only one formula is given in the available literature for preparing a magma containing a suspending agent. Gelatin is used in this instance. This formula given by Hilton (99) (1911) is as follows:

Magnesium sulphate	350 Gm.
Sodium hydroxide	119 Gm.
Gelatin	0.15 Gm.
Distilled water q.s.	1000 cc.

Dissolve the sulphate in 400 cc. water and filter. Dissolve the gelatin in 50 cc. hot water and add to the sulphate solution.

Dissolve the NaOH in 400 cc. water, cool and add 300 cc. water. When both have cooled add the NaOH to the sulphate in such a manner as to deliver the alkali in rapid drops. After all is added dilute to 3000 cc., allow to settle to 1000 mark, decant, add 2500 cc. water, decant. After two more such operations 4000 cc. are added, allowed to settle to 1000 mark, decanted, assayed and diluted if necessary.

An objection to the use of gelatin as a suspending agent has already been mentioned (see alkalinity).

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ERGOT ALKALOIDS.

Ergot Alkaloids and Their Actions. A. STOLL, Meeting Deut. Pharmakol. Gesellsch. Hamburg (9/12/28); *Klin. Wochschr.*, 7 (1928), 2223, No. 46, through *Squibb Abstract Bulletin.*

In a discussion following an illustrated lecture by Barger on the development of the ergot alkaloids and their actions, Stoll stated that amorphous ergotoxin and crystalline ergotamine appear identical in pharmacological examination, but the question of chemical identity has not as yet been solved. In spite of great similarities (same absorption spectra, etc.), there are also detectable differences, such as a difference of C_2H_4 in the formula. The conversion of ergotoxin and its derivatives (ergotinine) into ergotamine and vice versa has not been effected. Further chemical and physical-chemical data on these substances are to be obtained.—E. G.

ON ABBREVIATIONS IN PHARMACOPŒIA (U. S. P. X) AND NATIONAL FORMULARY (N. F. V). II.*

BY CHARLES C. PLITT.

At our 5th Annual Meeting held in St. Louis last summer, I presented a paper, "On Abbreviations in Pharmacopœia (U. S. P. X) and National Formulary (N. F. V),"[1] and showed numerous inconsistencies in abbreviating the same word, and also in abbreviating different words with the same endings. Not only are inconsistencies observed, when abbreviations in the Pharmacopœia are compared with those of the same words in the Formulary, but each of these authorities has its own quota of inconsistencies. It was then suggested that I make a study of some of the actual abbreviations used by physicians, and present my findings at this, the 6th Meeting.

In order to do this, I selected a number of assistants. As a consequence, I had the city fairly well divided. These assistants made lists of the abbreviations they found on prescriptions that came to their notice, and later handed them to me for final tabulation. I secured also another worker in New Jersey. His reports were much like those received at home, so much so, that I suspect my findings represent not only the condition found in Baltimore, but also fairly well that in the East.

The number of prescriptions studied was about 10,000. The number of physicians represented was more than 150. It would have been better to have made this study by tabulating physicians, rather than prescriptions, but this was a little more of an undertaking, and I hesitated to request this of my assistants.

I soon realized that the great majority of articles in the Pharmacopœia are not prescribed at all, and this applied to a greater extent to articles in the National Formulary. The list of articles prescribed by any one physician is, of course, very limited. This is also true for a locality, and even for a particular time. As to abbreviating these articles, each physician is a law unto himself; he abbreviates to suit himself, and all that he is interested in is to get the article that he prescribes. And so one finds that it is the more common names that are abbreviated in various ways, and at variance with those given in the United States Pharmacopœia and National Formulary. The unusual names, and the more difficult to write, are seldom wrongly abbreviated, since they are usually written out in full. Included in this list are those with long unwieldy names that the physician fights shy of using, and, if he prescribes them at all, he uses the trade name, as for example, salol, urotropine, etc. Many physicians now use the English official names, not only for these long unwieldy names, but for all names. A list of the names used is, upon the whole, a small one, probably less than 200. Of these, there are some that I found always correctly abbreviated, that is, abbreviated as in the Pharmacopœia and the Formulary; such are the following: ACACIA—**Acac.,** ARSENITIS—**Arsen.,** ATROPINA—**Atrop.,** AQUA—**Aq.,** BENZOAS—**Benz.,** BICARBONAS—**Bicarb.,** CAFFEINA—**Caff.,** CITRICUM—**Cit.,** CHLOROFORMUM—**Chlorof.,** COCAINA—**Cocain.,** COPAIBA—

* Presented at the Boston meeting of the Plant Science Seminar.

[1] *Am. J. Pharm.*, 9 (1927), 624–628.

Copaib., DIGITALIS—**Digit.**, DILUTUM—**Dil.**, FERRUM—**Ferr.**, LINIMENTUM—**Lin.**, LIQUOR—**Liq.**, LITHIA—**Lith.**, MAGNESIA—**Mag.**, MORPHINA—**Morph.**, OLEUM—**Ol.**, PETROLATUM—**Petrolat.**, STRYCHNINA—**Strych.**, SUBNITRAS—**Subnit.**, VIBURNUM—**Viburn.**, VINUM—**Vin.** Why these should be correctly abbreviated, and others equally simple are not, is not clear.

I will now take up those abbreviated not only as given in our official standards, but in various ways. Thus ACIDUM, as also noted among the inconsistencies in the National Formulary, was sometimes abbreviated by physicians Ac. A rough estimate of the proportion of the times the word was abbreviated Ac. to the times it was abbreviated **Acid.** is as 3:1. AMMONIUM, which is abbreviated **Ammon.**, was abbreviated more frequently **Am.** or **Amm.** I found it abbreviated correctly only once out of every ten times. AQUA, as already stated, was abbreviated correctly **Aq.**, whenever it was abbreviated, but AQUA DESTILLATA was almost always abbreviated "Aq. Dist.," instead of **Aq. Dest.**; in less than 5% of the times was it abbreviated correctly. AROMATICUM was most frequently abbreviated **Arom.**, but occasionally, as also noted among the inconsistencies I called attention to in my previous article, it was abbreviated **Aromat.** BELLADONNA was very often written out in full. It was generally abbreviated "Belladon.," and sometimes "Bella." I found it abbreviated **Bellad.** only occasionally. Thus, in about 50% of the times was BELLADONNA abbreviated, and of these, it was abbreviated **Bellad.** but 10% of the times. BISMUTH, when abbreviated was most times abbreviated **Bism.**, but occasionally it was abbreviated "Bis." BROMIDUM was abbreviated "Br.," "Bromid.," and **Brom.** In about 60% of the times it was abbreviated **Brom.**, as is sanctioned by the U. S. P. CAMPHORA was abbreviated most times **Camph.** but "Camp." was also occasionally seen. CAPSICUM, the Pharmacopœia says, should be abbreviated **Capsic.**, but I found it most often abbreviated "Caps." CARDAMOMUM, likewise, which should be abbreviated **Cardam.**, was almost invariably abbreviated "Card." However, this inconsistency is also noted in the National Formulary. CASCARA SAGRADA, I found abbreviated "Cas. Sagr.," "Cas. Sagrada," and "Cascara Sag.;" **Casc. Sagr.**, as sanctioned by the Pharmacopœia, was seen only occasionally. CHLORIDUM, which is most often abbreviated **Chlor.** in Pharmacopœia and Formulary, I found not only abbreviated this way, but also "Chlorid.," "Chl.," "Cl.," and "Mur." It was rather difficult to say which abbreviation was most popular. CINNAMOMI was generally abbreviated **Cinnam.**, but I found it abbreviated also "Cin." CITRATIS, I found abbreviated "Citrat." and **Cit.** The latter is the one recommended. The abbreviation is also the one for CITRICUM, and when thus used, is always used correctly. In other words, there seems to be a tendency to use "Citrat." for CITRATIS, and **Cit.** for CITRICUM. COCILLANA was abbreviated **Coccillan.**, and also at times "Cocill." This is an inconsistency also noted in the National Formulary. CODEINA should be abbreviated **Codein.** I found it most times abbreviated "Cod.," and when not abbreviated, the English name "Codeine" was used. "Codii" and "Codia" were also used. Compositus, a or um, was abbreviated "Comp." slightly more frequently than **Co.**, which is the official abbreviation. CREOSOTUM was generally written "Creosote."

EFFERVESCENS was abbreviated either "Effer.," or **Eff.** ELIXIR was generally abbreviated correctly **Elix.,** but I saw it also abbreviated "El.," and "Elx." ERGOTA, I found was most often written in English "Ergot," which happens to be also the correct abbreviation. I found it abbreviated also "Erg." EXSICCATUM was abbreviated "Ex." more often than **Exsic.,** which is the accepted abbreviation. EXTRACTUM, I found abbreviated "Extr.," "Ex.," and **Ext.,** the last being the official abbreviation. FLUIDEXTRACTUM was abbreviated in a great variety of ways, thus "Flext.," "Fl. Ext.," "Fl. Ex.," "F. E.," "Ext. Fl.," "Fluid Ext.," besides **Fldext.** The most popular way was "Fld. Ext." GENTIANA was always abbreviated "Gent." HYDRARGYRI was generally written out in full. The following abbreviations, however, were observed also: "Hyd.," "Hydrar.," "Hydg.," and **Hydrarg.,** which is official. Less than 50% were abbreviated correctly, when abbreviated. HYDRAS should be abbreviated **Hyd.,** but I found it just as frequently abbreviated "Hydr." HYDROCHLORICUM was abbreviated most times "Hydrochlor." Less than 5% of the times was it abbreviated **Hydrochl.** This is just the reverse of the condition noted in the Pharmacopœia. HYOSCYAMUS, when abbreviated, was seldom abbreviated **Hyosc.,** as recommended in the Pharmacopœia, but either "Hyos.," or "Hyoscy." IODIDUM was generally abbreviated correctly **Iod.,** but occasionally "Iodid.," and sometimes simply "I.," was used. **Ipecac** is the official abbreviation for IPECACUANHA. This, too, was generally used, and sometimes, "Ipec." LACTOSUM was only occasionally prescribed by that name. More often, it was prescribed as "Sac. Lact.," or "Sacch. Lactis," abbreviations for its old official name Saccharum Lactis. "Limonis," in LIMONIS CORTEX, was invariably prescribed as "Lemon," or "Lemonis." Here it is quite evident that the prescriber did not know the Latin name. MENTHA was generally abbreviated correctly **Menth.,** only occasionally did I find it abbreviated "Ment." MENTHOL, likewise, was generally abbreviated correctly, and only occasionally did I find **Menth.** or "Ment." used. As to the word *Misce,* it frequently was written Mix., instead of simply *M.* MISTURA, was generally correctly abbreviated "Mist.," although "Mxt.," I found sometimes used. MORPHINA was generally correctly abbreviated **Morph.,** however, I saw it often written "Morphine" or "Morphia." MUCILAGO was abbreviated "Muc." or **Mucil.,** the latter being the correct way. NUCIS VOMICAE was just as often abbreviated "Nux. Vom.," as **Nuc. Vom.** OLEUM, I found always correctly abbreviated **Ol.,** but OLEUM MORRHUÆ, I found abbreviated "C.L.O." OXIDUM was abbreviated most times **Oxid.,** but sometimes it was abbreviated "Ox." PEPSINUM should be abbreviated **Pepsin.,** I found it abbreviated also "Peps.," and "Pep." PHENOL is not abbreviated, and I found it most times written that way. Occasionally, it was prescribed as "Carbol. Acid." PHENYLIS SALICYLAS was most often prescribed as "Salol," although **Phenyl. Salicyl.** was also used. PHOSPHAS was abbreviated most times **Phos.,** and only occasionally "Phosph." PILULAE was abbreviated **Pil.,** which is correct, and "Pill.," the latter most frequently. POTASSII was abbreviated about 50% of the times correctly **Pot.;** about 40% of the times, it was abbreviated "Potass.;" the remaining 10% was distributed among "Kali.," "Kal.," "Potas.," or "Pottas." PRAECIPITATUM was generally abbreviated "Praecip.," and only

occasionally **Praec.** PULVIS was abbreviated **Pulv.,** "Powd.," "Pul.," and simply "P." There is quite a tendency to write the names now in English, and "Powd." appeared oftener than **Pulv.** QUININA was abbreviated generally correctly **Quin.,** but "Chinin." was also often found. RESORCINOL is abbreviated **Resorcin.** I found, besides **Resorcin.,** also quite often "Resorsin." SUCROSUM abbreviated **Sucros.,** was not often seen. It was generally prescribed as "Saccharum," which was abbreviated "Sacch.," "Sach.," and "Sac." SALICYLAS was generally abbreviated correctly **Salicyl.** SODII should be abbreviated **Sod.,** and was abbreviated that way most times. I found it abbreviated also "Nat.," "Natri.," "Na.," and sometimes "Soda." SODII BORAS, I found frequently prescribed as "Sod. Bibor." SOLUTIO was generally abbreviated correctly **Sol.,** but sometimes it was abbreviated "Solu." "S. T. Mist.," I learned was the abbreviation for Sore Throat Mixture. SPIRITUS, which should be abbreviated **Sp.,** I found abbreviated "Spir.," "Spr.," "Spt.," "Sprs.," "Spts.," and also "Ess." In less than 2% of the times was it abbreviated correctly. "Sprs." seemed to be the abbreviation most often used. SULPHAS, I found abbreviated most often either "Sul.," or "Sulp." In only about 10% of the times was it abbreviated correctly **Sulph.** SYRUPUS was abbreviated correctly most times **Syr.** I found it also abbreviated "Sy.," and "Sr." TABELLAE was generally abbreviated correctly **Tab.** I saw it also abbreviated "Tabs." In TERPINI HYDRAS, I found Terpini frequently abbreviated "Terp.," instead of **Terpin.** THIOSULPHAS should be abbreviated **Thiosulph.,** but just as SULPHAS was abbreviated "Sulp.," so THIOSULPHAS was abbreviated "Thiosulp." THYMOLIS is abbreviated **Thymol.,** and this abbreviation I found generally used, and only occasionally "Thym." TINCTURA, I found abbreviated **Tr.,** "Tinct.," "Tct.," "Tctr." and "Tinc." It was most often abbreviated **Tr.,** which is the abbreviation recommended in both Pharmacopœia and National Formulary. "Tinct." was used about one-half as often as **Tr.** UNGUENTUM was abbreviated **Ung.,** "Oint." and "Ungt." It was abbreviated just as frequently "Oint.," as **Ung.,** and only about 5% of the times "Ungt."

Just why we have this diversity in abbreviations among physicians is, no doubt, because no attempt has ever been made to teach them how the various articles in the Pharmacopœia and the National Formulary should be abbreviated. It is even likely that most physicians do not know of this feature in Pharmacopœia and Formulary, that, in them may be found so-called official abbreviations, which for the sake of uniformity should be used. Of course, it may be a question whether uniformity is desirable. However, upon the whole, it seems that it would be, if for no other reason than to eliminate all chance of any uncertainties. Now, if this is worth any consideration, abbreviations in the Pharmacopœia and in the National Formulary must be consistent, and every effort should be made to have them so. Further, it would seem also worth the effort to have the attention of our various medical schools called to this feature in the United States Pharmacopœia and in the National Formulary, with the recommendation that their students be taught, that when abbreviating any of the various articles in a prescription, it is imperative to use the abbreviations sanctioned by authority, and to abbreviate them as they are abbreviated in these two works of authority.

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THE EFFECT OF CLAY ON RANCID FATS.*

GEORGE W. FIERO.**

Many clays, the most common being fuller's earth, are found to have the property of adsorbing organic substances. Since these clays form colloidal solutions with water they are termed "colloidal clays." These are employed to a large extent in the petroleum industry to bleach oils. The process consists of percolating the oil through the clay or agitating the finely powdered clay with the oil. Super-heated steam and reduced pressure are often employed to hasten the action. Lloyd[1] reports that fuller's earth will entirely adsorb many alkaloids; Grettie and Hess[2] found that fuller's earth would adsorb such substances as acetanilid, urea, glucose, etc.

EXPERIMENTAL PROCEDURE.

I. Simple Agitation of Rancid Fat with Clay.—Rancid coconut oil and rancid lard were treated with varying quantities of clay and stirred constantly at 60° C. for three hours, being tested for rancidity every hour. A modification of the Kreis Test was employed to detect rancidity in lard: Equal quantities of lard and concentrated hydrochloric acid were heated in a test-tube covered with filter paper moistened with phloroglucinol solution, the extent of rancidity being determined by the intensity of the pink color. This method was employed since the Kreis Test could not be used unless the lard was first filtered, as the color of the clay obscured the color of the Kreis Test. This test was found to be satisfactory with lard, but coconut oil which was very rancid did not respond to this test or the Kreis Test satisfactorily and it was necessary to determine the extent of rancidity by the odor and taste. The results of this method are shown in Table I.

TABLE I.—SIMPLE AGITATION OF RANCID FAT WITH CLAY.

Fat.	Per cent clay.	Result. 1st hour.	2nd hour.	3rd hour.
Rancid Lard	5	Rancid	Rancid	Rancid
	10	Rancid	Rancid	Rancid
	15	Rancid	Rancid	Rancid
	20	Rancid	Rancid	Rancid
Rancid Coconut Oil	5	Rancid	Slight[1]	Not R.[1]
	10	Slight	Not R.	Not R.
	15	Slight	Not R.	Not R.
	20	Not R.	Not R.	Not R.

[1] Slight—had slight rancid odor and taste; Not R.—free from rancid odor or taste.

II. Treatment of Rancid Fats with Boiling Colloidal Solution of Clay.—Rancid coconut oil and rancid lard were floated upon an equal volume of boiling water con-

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[1] JOUR. A. PH. A., 5 (1916), 381.

[2] *J. Am. Chem. Soc.*, 50 (1928), 668.

taining varying quantities of clay for a period of 45 minutes, being tested as above every fifteen minutes. Water was added from time to time to keep a constant volume. The results of this method are shown in Table II.

TABLE II.—TREATMENT OF RANCID FATS WITH BOILING COLLOIDAL SOLUTION OF CLAY.

Fat.	Per cent clay.	Result. 15 min.	30 min.	45 min.
Rancid Lard	0	Rancid	Rancid	Rancid
	5	Rancid	Rancid	Rancid
	10	Rancid	Rancid	Rancid
	15	Rancid	Rancid	Rancid
	20	Rancid	Rancid	Less R.
Rancid Coconut Oil	0	Rancid	Rancid	Rancid
	5	Less R.	Slight	Not R.
	10	Not R.	Not R.	Not R.
	15	Not R.	Not R.	Not R.
	20	Not R.	Not R.	Not R.

III. Super-Heated Steam and Reduced Pressure with Rancid Fat and Clay.—Rancid coconut oil and rancid lard containing varying quantities of clay were treated with superheated steam at 105° to 110° C. and under a pressure of 600 to 620 mm. for a period of ninety minutes. The steam from the reaction was passed through concentrated hydrochloric acid and then through paper moistened with phloroglucinol solution. The paper became colored pink in the case of lard, indicating the presence of products of rancidity in the steam, but remained white with the coconut oil. The results of this method are shown in Table III.

TABLE III.—SUPER-HEATED STEAM AND REDUCED PRESSURE WITH RANCID FAT AND CLAY.

Fat.	Per cent clay.	Result.
Rancid Lard	0	Rancid odor, strong test[1]
	5	Rancid odor, same test
	10	Rancid odor, same test
	15	Less rancid odor, slightly less intense test
	20	Slight odor, less intense test
Rancid Coconut Oil	0	Rancid odor, gray-brown color
	5	Slight odor, white color
	10	Odorless, white color
	15	Odorless, white color
	20	Odorless, white color

[1] Modified Kreis test for rancidity.

SUMMARY.

Clay was found to entirely renovate rancid coconut oil by three methods: (1) simple agitation, (2) treatment with boiling colloidal solution, and (3) treatment with clay and super-heated steam and reduced pressure. The renovated coconut oil was found in all cases to be similar to the fresh fat, being odorless, tasteless and having a white color while the rancid fat was dark gray in color and had a very disagreeable odor and taste.

The first method was found to be more satisfactory because no water was used (hence no hydrolysis) and the renovated fat was found to remain free from rancidity when exposed to air and light longer than the other renovated samples and longer than a sample of fresh coconut oil.

None of the three methods would entirely renovate lard under the conditions of the experiment although the rancid odor was diminished in all methods with fifteen to twenty per cent of clay.

SYNONYMS—A VALUABLE ASSET TO THE PRACTICAL PHARMACIST.*

BY OTTO RAUBENHEIMER, PH.M.

"Out of his surname they have coined an epithet for a knave,
And out of his Christian name, a synonym for the devil."—Macauley—On Machiavelli.

The writer for many years has filled the position of a national, in fact "International Pharmaceutical Information Bureau," answering at the rate of about one thousand questions annually by phone, mail or telegraph. May I be permitted to state that this service is rendered entirely free of charge, merely with the good intention of sharing my limited knowledge with my brother pharmacists. These inquiries either come from other retail, wholesale and manufacturing druggists or from pharmaceutical journals—both domestic and foreign—therefore the title "International."

As about 30 per cent of these inquiries pertain to synonyms and foreign names, I have, upon due inquiries, reached the following conclusions:

1. The study of synonyms in the college course is neglected by the pharmacist.
2. The post-graduate study of synonyms is still further neglected by the pharmacist.
3. The library of the average pharmacist does not contain books on synonyms. To my great regret, I am compelled to state that instead of at least a five-foot shelf of books, I find a space of about four inches devoted to this library, which consists of a copy of the U. S. P. and N. F. (sometimes even old editions at that) which two books, according to the law of most states, must be kept on hand.

Common and vernacular names of drugs, chemicals and preparations sold over the counter are in daily use by the public and the sale will be lost if the pharmacist is not acquainted with these synonyms, or has no reference books to look up the meaning. Examples of this sort are the multitude of vernacular names of botanical drugs, which names are entirely unknown in another section of the country. As a concrete example let me point out the following occurrence. During Pharmacy Week I exhibited a Medicine Chest over 100 years old, containing among other articles a bottle labeled "Coxe's Hive Syrup." The manager of one of Brooklyn's largest drug stores admired this display, but never heard of this syrup.

On prescriptions the physician will also use Latin synonyms, especially if he wants to keep the patient in ignorance of the remedy which he prescribes, which is sometimes, but not frequently, the case. Examples of that sort are prescriptions calling for *Aquilla Alba* or *Oleum Palmae Christi*, *Tinct. Macrotys*, *Sal culinare*, *Propenylis Hydratis*, *Ung, Emolliens*. In at least one case the pharmacist needed *Aqua Bullientis* and ordered same from the wholesaler, who promptly sent same in a "Thermos" bottle. Tableau!

The chemical names of the newer or synthetic remedies also cause a great deal of annoyance if not confusion. As the average druggist is not a chemist, he

* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1928.

is frequently in the dark if the chemical name is given in place of the trade-mark, for instance:

Resorcinol monacetate is better known as *Euresol;* atropine methyl nitrate is *Eumydrin;* diacetyl-dihydroxy-phenyl-isatine is better known as *Isacen;* allyl-iso-propyl-barbituric acid-phenyl-dimethyl-dimethyl-amino-pyrazolon is *Allonal.* While the ignorance of these long chemical names is somewhat excusable, although the pharmacist should be provided with books on Newer Remedies, so as to look same up, a large number of cases have come to the writer's attention, for which there is no excuse, from which I will quote the following few. A prescription called for *Antipyrin Salicyl.* The druggist did not compound it although he had "Salipyrin" in stock. Another one for *Rubrum Scarlatinum* was refused, although "Scarlet Red" was on hand. Another prescription with *Methenamin* as one of the ingredients was delayed for six hours so the doctor could be consulted. Had this druggist consulted the U. S. P. X he would have seen at once that this was the new title for "Hexamethylamine." After all, a little common sense is quite helpful in the deciphering of synonyms or trade names.

In my address as Chairman of the Section of Practical Pharmacy and Dispensing at the Richmond Convention, May 1910 (PROC. A. PH. A., Vol. 58, page 1091) one of my recommendations was the study of synonyms, especially by the practical and dispensing pharmacist. In an early number of the JOUR. A. PH. A., I (1912), 173–176, I even started a Department of Synonyms, divided into Latin-English, English-Latin, German-Latin and French-Latin. Not receiving any coöperation from other members, the writer dropped the subject.

In large cities with a cosmopolitan population the customers frequently know the name of the remedy only in their native tongue and the knowledge of a little foreign "lingo" will attract them to your store. The sign "Deutsche Apotheke" still stands for "Reliability." In my own pharmacy we cater to these foreign customers and I will give a few daily examples: Germans will call for *Essigsaure Tonerde*—meaning Solution Aluminum Acetate; British for *Condy's Fluid* which is a solution of potassium permanganate; French, for *Fleurs de Tilleul*—Linden Flowers; Italians, for *Sanguette*—Leeches; Spaniards, for *Comino*—Cumin Seed; Jews, for *Mailines*—Dried Raspberries.

HISTORY OF SYNONYMS.

In order to make this paper somewhat complete, I herewith include a bit of history abstracted from Schelenz: "Geschichte der Pharmazie," Tschirch: "Handbuch der Pharmakognosie" and LaWall: "Four Thousand Years of Pharmacy," the proper page references being given.

Dioscorides, about 50 A.D., the Father of Materia Medica wrote a book "VO Sa," on synonyms, containing the plant names in Roman, Etruscan, Punic, Egyptian, etc. ("Schelenz," page 132). Under Glycyrrhiza, Dioscorides mentions 12 synonyms ("Tschirch," Vol. 1, page 300). The Greek lexicographer Suidas, about 970, wrote a "Synonymarium." Constantinus Africanus (1010–1087) the "Orientes et Occidentes Doctor," who traveled for 40 years and then had to flee from Carthage to Salerno, wrote a Glossary of Herbs and Drugs ("LaWall," page 129).

The School of Salerno and its lexicographers during the 12th and 13th centuries were authors of many books on synonyms ("Tschirch," Vol. 1, page 300). One

of the first official formularies, "Antidotarium Parvum," written by Nicolaus Praepositus, Dean of Salerno, about 1100, contains an Appendix of synonyms, whose author is said to be Johannes Actuarius ("Schelenz," page 307). Another Table of Synonyms which spread all over Europe was "De Nominibus Herbarum et Specierum et Aliorum, que autonomas ponuntur" ("Schelenz," page 310). Farragius Judæus of Salerno in 1276 published "De Expositione Vocabularum, seu Synonymorum Simplicis Medicinæ ("Schelenz," page 316). Simon de Cordo Januensis, or Simon of Genua, physician to Pope Nicolas IV, who died in 1293, after studying plants in Greece and the Orient, utilized over thirty years of his life, 1270 to 1303, to write "Synonyma Medicinæ," again published in Parma 1473, Padua 1473, Venice 1514 and Lyon 1534 ("Tschirch," Vol. 1, page 563 and "Schelenz," page 329).

In 1562 there was published in Venice "Mesue Graecorum ac Arabum Opera Omnia," a compilation of Greek and Arabian authors with comments by Jacob Sylvius and John Monardus. This work also contained a chapter on "Succedanaea" and a complete list of Synonyms ("LaWall," page 225). The "Luminare Majus," by John Jacobus Manlius de Bosco of Alexandria, also contains a list of Synonyms. This work was published in Venice 1494, 1496 and 1501 and remained an authentic book until the middle of the 16th century ("Schelenz," page 407). According to Schelenz (page 418) the first complete and separate book on synonyms was entitled "Medicinæ Herbariæ" by Johann Agricola, who died in 1570; he was professor of Greek Literature and professor of Medicine at the University of Ingolstadt, Bavaria. He is not to be confused with George Bauer, who latinized his name to Agricola (1490–1555) the father of scientific mineralogy and metallurgy. Caspar Bauhin wrote "Pinax Theatri Botanici," Basel 1623, 1671 and 1735, which contained 6000 plant names ("Tschirch," Vol. 1, page 300).

SYNONYMS IN THE PHARMACOPŒIAS.

One of the oldest official pharmacopœias, the one of Cologne, "Pharmacopœia Coloniense," 1627, contains a separate list of synonyms entitled "Nomenclaturam item chymicorum et abstrusorum vocabulorum cum notis chymicis.

"Pharmacopœia Persica exidiomate Persico in Latinum conversa," by Angelus Sancto Joseph, Lutetiae Parisorum, 1681.

"Nomenclatore botanicus plantarum in terris Danicis," by G. C. Oder, Hafniae 1769.

"Pharmacopœia Amstelodamensis nova," 1792 contains an Index Synonymorum.

As early as 1821 there was published in Berlin a book on the comparative nomenclature of the principal Pharmacopœias by Dr. E. L. Schubarth entitled "Vergleichende Nomenklatur der vorzueglichsten Pharmakopoen der deutschen und angrenzenden Laender." It is a strong coincidence that this year, 107 years after Schubarth's work, there was published a similar book by the Deutscher Apotheker Verein in Berlin, namely "Synonyma der Deutschen Azneibücher" zusammengestellt und ergänzt by Dr. Alfred Adlung und Dr. Paul Vasterling. This excellent little book of 128 pages, a copy of which I have here for inspection, contains a collection of the Latin, and some German, titles and synonyms of the six German Pharmacopœias and four Ergänzungsbücher (Supplements corresponding to our N. F.). The official titles are underlined and trade-mark names are desig-

nated with a cross (+). The following for examples will give an idea of the thoroughness of this compilation:

Acetum Aromaticum. *Aromatischer Essig, Genürzessig, Räuberessig Pestilenzessig, Acetum anglicum, beroliense, pestilenziale, antisepticum, bizoardicum, prophylacticum, quatuorlatronum.*

Radix Liquiritiæ. *Süssholz, geschältes, auch Russisches Süssholz, Lakritzenholz,* Radiz Liquiritiæ, oder Glycyrshizæ Russicæ, Hispanicæ, glabræ, mundata, echinata.

Veronal.+ *Diäthylbarbitursäure, Diäthylmalonharnstoff, Acidum diaethylbarbituricum.*

This collection of synonyms will be of great help not only to the practical pharmacists, but also to writers and authors and, last but not least, to the members of the Revision Committee of Pharmacopœias and similar standards.

The German and other Teutonic Pharmacopœias contain in the Appendix a Table of Synonyms, which in D. A. B., VI (1926), occupies five pages and in the E. B., IV (1916), 10 pages. The following examples will serve as illustrations.

D. A. B. VI.	E. B. IV.
Argilla alba—*Bolus alba.*	**Flores Naphae**—*Flores Aurantii*
Mercurius vivus—*Hydrargyrum*	**Oleum Napi**—*Oleum Rapae*
Weisse Augensalbe—*Ung. Zinci*	**Harlemer Oel**—*Ol Terebinthinae sulpuratum*
Speckstein—*Talcum*	**Welters Bitter**—*Acidum Picronitricum*

The E. B., III (1906), with a 10-page table also contains real organic chemical synonyms for instance: *Ortho-Aethoxy-Ana-Benzoyl-Amido-Chinolin*—**Analgen.** In this case and a great many others, the trade-mark was coined from the chemical name.

Now let us see what stand the U. S. P. takes on Synonyms. The U. S. P., 1820, contains a Latin Index of Names and Synonyms of four double-column pages, of which the following will serve as illustrations: **Creta,** *vide Calcis carbonas;* **Lytta,** *vide Cantharides;* **Succus Inspissatus,** *vide Extractum.*

The U. S. P., 1820, furthermore contains a four-page double-column Index of English names and synonyms, in which I find: *Blistering Cerate* see **Cerate of Cantharides;** *Citrine Ointment* see **Ointment of Nitrate of Mercury;** *Volatile Salt,* see **Carbonate of Ammonia.**

Now as to the status of the present U. S. P. and Synonyms. Under General Principles to be followed in Revising the U. S. P. X that book makes the following statement on page XLV:4. *Synonyms.*—It is recommended that the use of synonyms should be extended in the next revision, and the synonyms printed in the text of the Pharmacopœia, immediately after the official English name of the substance. When an article is known in commerce under more than one commonly used English name, such vernacular titles may be given as synonyms. A statement shall be made in the Preface of the U. S. P. that substances labeled with an official synonym must comply with the same standards, tests and requirements as are demanded for the article under the official title.

The Preface of U. S. P. X on page XI states:

Synonyms, printed in small type, will be found following some titles. The Convention passed the following resolutions:

Substances labeled with an official synonym must comply with the same standards, tests and requirements as are demanded for the official article. It is understood that a synonym

appearing under the title of a drug applies with equal force to any official preparations made from that drug.

The Preface of U. S. P. IX on page XXVIII gives the same statement, but with the following addition: In a few cases synonyms are enclosed in quotation marks; these names, while not scientifically correct, are so largely used in commerce that it seems wise to include them.

Sorry to say, this explanation was omitted from U. S. P. X which authority, nevertheless, under **Sodii Thiosulphas,** gives the synonym "*Sodium Hyposulphite.*"

Under General Principles to be followed in the Revision of N. F. V, the statement on page XV, No. 5, Acceptance of U. S. P. principles also pertains to synonyms.

SUBDIVISION OF SYNONYMS.

I have divided the synonyms into the following classes: (1) Animal, (2) Vegetable or Botanical, (3) Mineral or Chemical, (4) Preparations, (5) Proprietaries, (6) Trade-Mark Names.

As to their language we have the following three subdivisions: (1) English and Vernacular, (2) Latin, (3) Foreign Names.

The English or vernacular or provincial synonyms are generally a great deal of annoyance to the pharmacist and druggist. This is especially true in *Botanical Drugs*, which are known by *entirely different names in different sections of the United States of America.* Matters are still made worse as many synonyms have been erroneously applied. In such a chaos a reliable reference book is needed—and badly needed. The best in my opinion is "Plant Names, Scientific and Popular" by the late Dr. A. B. Lyons, who will be remembered, in fact revered, by most members of the A. PH. A. This work includes in the case of each plant the correct Botanical Name in accordance with the reformed nomenclature, together with Botanical and Popular Synonyms and many Vernacular, German, French and Spanish Names. As this book contains a very complete Index and a great many vernacular names, I can highly recommend it.

Among the many books on *Chemical Synonyms* I want to call attention to "The Condensed Chemical Dictionary," published by the Chemical Catalog Co., New York City. Besides Synonyms the following information is given: Derivation, Habitat, Constituents, Properties, Constants, Uses, Method of Purification, Grades, Containers, Fire Hazard and R. R. Shipping Regulations. The "P. W. R. Manual," published by Powers-Weightman-Rosengarten Co., Philadelphia contains many chemical synonyms, for instance under **Acid Benzoic**—*Phenylformic Acid;* under **Carbon Tetrachloride**—*Perchlormethane,* under **Pelleterine Tannate**—*Punicine Tannate.* This book could be improved by cross references.

That works on *Pharmaceutical Synonyms* are much in demand can be seen from the publication of books over 100 years ago. As early as 1826 the Philadelphia College of Pharmacy published a "Druggist's Manual" with Latin and English Synonyms and the German, French and Spanish Names of Drugs. (For particulars see "First Century of P. C. P.," page 71.) Several other publications have appeared in the United States to which I will briefly call attention.

Dr. Fr. Hoffmann: "Volksthümliche Deutsche Arzneimittelnamen," *Pharm. Rundschau,* New York City.

Dr. Fr. Hoffmann: "Popular German Names of Drugs and Medicines" (3 editions), Pharm. Review Publishing Co., Milwaukee.

Harold Bruun: "Popular Scandinavian Names of Drugs and Medicines," Pharm. Review Publishing Co., Milwaukee.

A. Graa: "Polyglot Pharmaceutical Lexicon of Drugs, Chemicals and Pharmaceutical Products with their synonyms in Latin, English, German, French and Italian." 1904, Luthin & Laufer, New York City.

A. Graa: "Manual of International Pharmacy." A very extensive Collection of Drugs, Chemicals and Pharmaceutical Products with their synonyms in Latin, English, German, French and Italian. 1911, Anrig & Co., West Hoboken, N. J. The last-named book is a masterwork of 450 pages. Graa, an old Swiss pharmacist, who mastered the five languages, spent most of his life on the compilation of this book, which, however, was not a financial success as the druggists hated to part with $5.00. In disgust with American pharmacy and, besides, being deprived of his wine by the Volstead Act, Graa went back to Switzerland, where the writer had a pleasant visit with him in Basel during his European trip in 1926. I might also state that the publishers have disposed of the books on hand as old paper and the work is now unobtainable.

BIBLIOGRAPHY.

For those pharmacists interested in this subject of Synonyms I append the following bibliography. The classification is I, Botanical; II, Chemical; and III, Pharmaceutical. I have tried to make this bibliography as complete as possible, or at least to be a fairly representative list of books contained in my own somewhat voluminous private library. In many instances I have added comments.

I. Botanical: A. B. Lyons, "Plant Names, Scientific and Popular," Nelson Baker & Co., Detroit.

J. Rudolphy, "Pharmaceutical Directory and Hand Book," New York City. English Botanical, Pharmaceutical and German Names.

J. M. Nickell, "Botanical Ready Reference," Murray & Nickell Mfg. Co., Chicago. Botanical, Common, Pharmacopœial and German Names.

Wren and Holmes, "Potter's Cyclopoedia of Botanical Drugs and Preparations," Potter & Clarke, London, E., 3rd Edition, 1923.

"Standardized Plant Names," a catalog of approved scientific and common names of plants in American Commerce. American Joint Committee on Horticultural Nomenclature, Salem, Mass., 1923.

"Spatula Herb Book," Popular and Botanical Names, Boston.

II. Chemical: "Condensed Chemical Dictionary," The Chemical Catalog Co., New York City.

"The Chemical Age Chemical Dictionary," Van Nostrand Co., New York City.

Wm. Gardner, "Chemical Synonyms and Trade Names," Crosby, Lockwood & Son, London. An excellent book to which a Companion Volume has since been added.

Darling, "Inorganic Chemical Synonyms."

"P. W. R. Manual," Powers-Weightman-Rosengarten Co., Philadelphia.

H. Remy, "Chemisches Wörterbuch," Teubner, Leipzig.

III. Pharmaceutical: C. F. Schulze, "Pharmaz. Synonymen nebst ihren volkstümlichen Benennungen" (also gives historical data), Julius Springer, Berlin, N. W.

J. Holfert, "Volkstümliche Arzneimittel-Namen."

Holfert-Arends, "Volkstümliche Arzneimittel-Namen," Julius Springer.

G. Arends, "Volkstümliche Namen der Arzneimittel, Drogen und Chemikalien," 10th Edition, 1926, Julius Springer, Berlin.

Novak and Roch, "Synonyma Apothecariorum in Latin, German and Bohemian," S. Karger, Berlin.

A. T. Kauhse, "Dictionary Pharmaceutical Names and Synonyms in Latin, Russian, German and French," St. Petersburg, 1903.

L. Wiorogorski, "Lexicon Synonymorum Pharmaceuticorum." Seven thousand medicines in Latin, German, French, English, Polish and Russian. The articles, including newer synthetic remedies, are voluminously treated with regard to vernacular names. Warsaw.

E. F. Anthon, "Handwörterbuch der chem. pharmaz. techn. und pharmakogn. Nomenklaturen" in Latin, German and French. Karl Voigt, Jr., Weimar. Under Mercuric Chloride there are sixty-two Latin, forty-three German and seventeen French synonyms given.

Nemnich, "Neues Waren—Lexikon" in twelve languages—German, Holland, Danish, Swedish, English, French, Italian, Spanish, Portuguese, Russian, Greek and Latin. Hamburg, 1820. An old book, but still very useful.

Dr. Karl König's "Warenlexikon für den Verkehr nit Drogen und Chemikalien," 12 editions, 1911, Vieweg & Sohn Braunschweig in Latin, German, English, French, Dutch and Danish.

Dr. Siegfried Hahn, "Internationales Wörterbuch der gebräuchlichsten Arzneimittel." Latin, German, French, English, Italian. Gust. Hempel. Berlin.

Dr. Friedr. Hoffmann, "Volksthümliche Deutsche Arzneimittel-Namen," *Pharm. Rundschau*, New York City.

Dr. Friedr. Hoffmann, "Popular German Names of Drugs and Medicines," Pharm. Review Publishing Co., Milwaukee.

Harold Bruun, "Popular Scandinavian Names of Drugs and Medicines," Pharm. Review Publishing Co., Milwaukee.

A. Graa, "Polyglot Pharmaceutical Lexicon," New York City, 1904.

A. Graa, "Manual of International Pharmacy," West Hoboken, N. J., 1911.

A. Graa, "Vocabularium Pharmaceuticum," Basel, 1924.

CONCLUSION.

Let me hope that this paper will arouse a little more interest in the knowledge of synonyms and that the pharmacist, especially the practical and practicing pharmacist, will increase his library with books on this subject. If this object is obtained then the author is well paid for the time and trouble he has taken in the preparation of this paper.

SCIENCE IN EVERY-DAY LANGUAGE.

A Chinese Rhubarb Story.

Prof. Anton Hogstad, Jr., writes in the *Rocky Mountain Druggist*, for March, that "the late Dr. Henry Kraemer—a master pharmacognosist in his day—always delighted in telling his students the manner in which a certain pharmaceutical manufacturing house took great pride in the selection of the Chinese rhubarb that entered into their various rhubarb preparations. "Only the sound rhubarb rhizome and roots were selected, the black-hearted pieces being discarded.

"The cathartic activity of rhubarb depends upon the presence of certain oxymethyl anthraquinones for their activity, the drug being referred to as one of the emodin-bearing group, which group includes Cascara, Frangula, Aloes, Senna, etc.

"These oxymethyl anthraquinones when acted upon by the alkaline juices of the intestines are changed in their chemical composition, the new compounds as formed cause an irritation resulting in catharsis.

"Here is the interesting part of the story. Studies on the black-hearted rhubarb rhizomes and roots have shown them to possess greater cathartic action than the beautiful, sound specimens of drug. No doubt in the rotting process that took place within the drug specimens producing black-hearted samples, a similar change resulted as takes place in the intestines, producing compounds that possess greater cathartic action than the original oxymethyl anthraquinones as found in the drug itself. Thus we are inclined to believe that at times the poorest may be better than the best."

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

HORACE HAMPTON TELLS HOW TO GET PRESCRIPTION BUSINESS.

(*Concluded from p. 398, April Issue.*)

Luncheon over, Horace Hampton and his friend and classmate, Floyd Hamel, Cleartown druggist, were back in Mr. Hampton's store.

"This has been very kind of you, Horace," began Mr. Hamel, "to take all this time and trouble to tell me in detail just why prescription business is so profitable and desirable and to explain how I can figure how much of it there is to be had in Cleartown. If I had known some of the things ten years ago that you told me to-day, I would be a lot better off financially. The one thing that distinguishes a druggist from all other retail merchants is his professional training and standing. I can see now how I have been neglecting the very thing which should have been my biggest asset."

"Well, Floyd, the thing to do is to look ahead and not backward. If I've told you anything to-day which you can use, I am more than pleased."

"You have said several times, Horace, that there are three steps in this matter of building up the professional standing and practice of a drug store. Two of them you've already explained to me: First, why prescription business is desirable and, second, how to figure how much of it there is. Now that you've explained both of these propositions for me, the concluding step is how to go about getting this business.

"Yes, that's the real problem. It is easy enough to figure out that something is desirable but quite another matter to obtain it."

"You talk as if the proposition is rather hopeless."

"Not at all. I am simply saying that it takes a lot more than merely wishing to bring a worthwhile volume of prescription into your store or into any store."

"What's the first thing to do?"

"There is a long-established principle of salesmanship that to build a permanent success in selling, the product must be right. In this case the product is your prescription service. You really have two people to satisfy—the patient and the physician.

"Consider first what you have to do to make your product right in the eyes of the physician. You know as well as I do, what it means—a clean, neat and

* Instructor of merchandising, Wharton School of Finance and Commerce, University of Pennsylvania, Lecturer on Business Administration, Philadelphia College of Pharmacy and Science.

orderly prescription room; balances, mortars, glassware and other equipment, accurate and immaculate; standard ingredients and everything used fresh and full strength; neat, typewritten labels; painstaking care in the way in which the prescription is packaged.

"I am speaking now only of external appearances. It is taken for granted that any pharmacist can be depended upon for unfailing accuracy and skill in compounding.

"If your store is laid out like most stores, your customers won't see any of these things, except the results of your care and skill in attractively packaging your prescriptions. Physicians will see many things that your customers don't see or at least don't recognize; however, you know that physicians can't fail to be impressed favorably by the neat and orderly appearance of your prescription department and your evident care in all the details in prescription compounding.

"The other important step in getting the product right is in the store itself. You can't expect physicians to recommend your services to their patients if your store is plastered from one end to the other with signs and preparations inviting self-medication in ways which are contrary to accepted medical practice. It is just as if an automobile manufacturer were to suggest to prospective buyers that they look into the pleasures of bicycle riding.

"Physicians can have no objection to your recommending personally and by display any of the accepted, simple home remedies; in fact they believe that this actually is a help to their practice. Their objection, and a perfectly justified one, I think, is to a druggist seeking, with one hand, business in cure-alls and nostrums and, with the other hand, asking for the professional business directed to him by physicians.

"Granted that you do get your prescription business on a high plane, it doesn't follow that immediately you are going to start filling 10 or 20 times as many prescriptions as you do now. Of course, physicians will learn gradually that you do conduct the professional side of your business on a very high plane. The hitch is in that word *gradually*. You may be an old man, Floyd, before enough of them have learned about it forcefully enough to result in your having an important volume of prescriptions.

"The problem thus becomes one of speeding up the rate at which physicians learn about your high professional standards and practice. That is up to you. If you wait for them to find it out, it will take a long time. On the other hand, if in a dignified and perfectly ethical manner you take it upon yourself to acquaint physicians with these facts, you accomplish your purpose long before you otherwise would."

"What is this dignified and perfectly ethical method which I can use to get physicians interested enough in my prescription department to send their patients to me, Horace?"

"The plan I used, and the plan which I think you can use profitably, was to go out and call on the physicians whom I felt should be recommending my prescription department."

"You mean, Horace, I should go around and tell them all what a wonderful pharmacist I am?"

"No, indeed, Floyd, you have to be a lot more subtle than that. In the first

place, if you were to go out simply with the idea of explaining to physicians your talents in pharmacy, you would find them, at the best, only vaguely and generally interested. That is to say, the effect of your call would be hazy and indefinite, and hazy and indefinite efforts produce hazy and indefinite results. You want definite, tangible results in the form of prescription business.

"The way I did was not to go out with the idea of selling my professional services but rather with the idea of selling specific pharmaceutical products. Call it detailing, if you want to. This had for me, at least, a two-barreled effect. There are so many new pharmaceutical products being introduced every month that it is a physical impossibility for a physician to keep posted on all of them. I found that I was able to get and hold their interest by talking intelligently on new products which would be of profit to them in their practice. In fact, I was fortunate enough to be able to make enough direct sales to physicians in the kind of pharmaceutical products that can be sold to a physician, to make my calls profitable from that standpoint alone.

"More important, however, I felt that an impression I was leaving after each one of those calls was that I had an up-to-the-minute knowledge in a profession which is none too well understood anyway. Therefore I seemed to be a pharmacist to whom the physician could safely refer his patients.

"As you know, when I started in business I had very little money and I simply had to make my time spent in calling on physicians immediately profitable. Luckily, it worked out all right and I feel sure sooner or later, that in working along similar lines in Cleartown, the impression is going to be created among the worthwhile physicians here that you are the up and coming and outstanding pharmacist of the town.

"So far, I have said nothing about selling your prescription services to patients. Really, though, it is much more important to get the active coöperation and interest of the physicians. If a physician definitely tells a patient to take a prescription to your store, the chances are decidedly remote that he will do anything but what the doctor tells him. That is why it is so important to deserve and have the good will of physicians.

"Nevertheless, there are some things you can do profitably to interest customers in your prescription work. You have seen, I am sure, suggestions for letter inserts, blotters, newspaper advertising and cards to display in the store.

"However, the most important thing, it seems to me, is to remember that prescription service, as far as the customer is concerned, is usually an emergency matter. When a prescription is to be filled the customer is perhaps ill himself or certainly under a strain and anxious to be served as quickly as possible. Your best opportunity to please him is by speedy, confidence-inspiring service. It is well also to popularize the idea that your store is as near as the customer's telephone and that your delivery service is prompt and dependable."

AMERICAN LIBRARY ASSOCIATION MEETING.

The American Library Association held its fifty-first annual convention in Washington during the week of May 13th, with an attendance of more than 2000 members, representing organizations and groups from every state in the Union and the provinces of Canada.

STABILITY OF SYRUP OF FERROUS IODIDE.*

BY H. E. BECKER AND F. F. BERG.

Preservation of Syrup of Ferrous Iodide is a problem which has been given considerable attention for many years and still gives evidence that it has not been successfully solved in the present U. S. P. X formula.

The earliest efforts at preservation of a Ferrous Iodide preparation were based on use of sufficient sugar as a preservative, hence the preparation of a syrup of Ferrous Iodide, the theory held being based on knowledge that saccharin solutions retard oxidation, and it is and has been held that oxidation is the cause of color change from light green to yellow, through amber to a dark brown.

In order to test out the theory that oxidation was the cause of darkening, a lot of U. S. P. X Syrup of Ferrous Iodide was prepared, using boiled distilled water, and further sub-divided in 2-oz. flint bottles, same being completely filled to exclude oxygen.

One-half of these completely filled bottles were evacuated by aid of a vacuum pump and the vacuum broken by means of nitrogen, and securely stoppered. The two sets of syrup so prepared were then stored under varying temperature conditions, room temperature and in a refrigerator (about 50° F.).

After a period of three months all the samples stored at room temperature showed decided darkening, even though oxygen had been removed from the product, whereas the set stored at ice-box temperature had maintained a light green color, but caused crystallization of sugar in the product.

An examination of the set stored in the refrigerator at the end of nine months showed slight discoloration; these samples were tested for free iodine, but none was found, hence it would seem the discoloration of the syrup of Ferrous Iodide may be due to caramelization.

Hypophosphorous acid has been used in preparation of Syrup of Ferrous Iodide throughout a number of revisions, and on the theory that its action on the sugar may cause discoloration, as a result of caramelization, two further series of comparative products were prepared.

A.—Strictly U. S. P. X product (with hypophosphorous acid).

B.—U. S. P. X product, except 3 Gm. of citric acid per 1000 cc. were substituted for the hypophosphorous acid.

The two above sets of samples were packaged in flint bottles which were then placed in card board containers and stored at room temperature in a laboratory cabinet in order that light influence might be avoided.

These two sets of samples have at this time been under observation for a period of four months and show that a definite change has taken place in the strictly U. S. P. X product, whereas the product prepared with citric acid is the characteristic light green of freshly prepared Syrup of Ferrous Iodide. A test applied to a sample of the U. S. P. X product gives no reaction for free iodine, indicating that darkening is not due to liberation of this element.

In a paper by John C. Krantz, Jr.[1] entitled: "A Study of the Relative Pre-

* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1929.

[1] JOUR. A. PH. A., 12 (1923), 963.

servative Values of Glycerin and Sugar Solutions in Certain Official Preparations," the author cites an examination of Syrup of Ferrous Iodide in which Dilute Hypophosphorous Acid was used, that within ten days 94.2% of the sucrose showed inversion.

In the series of articles which have appeared in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, during the past year by Braford and Langenhan[1] it is brought out in several instances that citric acid has been advocated at various times as a preservative for Syrup of Ferrous Iodide.

In the above-named article it is also pointed out that the pharmacopœias of Holland, Austria, Switzerland, Belgium and Hungary all prescribe the use of citric acid.

Some years ago Syrup of Ferrous Iodide, using citric acid instead of hypophosphorous acid, was successfully prepared in Squibb Laboratories, and experiments herein enumerated seem to point to the fact that greater stability of Syrup of Ferrous Iodide may be obtained through the use of citric acid instead of hypophosphorous acid, which seems to be a decided factor in discoloration of the preparation, and that the generally accepted theory, that darkening is due to oxidation is in reality a caramelization of the sugar.

PHARMACEUTICAL AND CHEMICAL
LABORATORIES OF E. R. SQUIBB & SONS,
BROOKLYN, N. Y.

PHYSOSTIGMINE PHARMACOLOGY.

Contribution to the analysis of the action of physostigmine in warm-blooded animals. Zucker–Proc. German Pharm. Soc., Sept. 12, 1928; *Arch. exptl. Path. Pharmakol.*, 138 (1928), 139; through *Squibb Abstract Bulletin*, Feb. 6.

The results of the former and recent investigations with physostigmine in various animals and in neurological cases point to the misunderstood poisonous action of this drug, whose point of attack is supposed to manifest itself in the form of a purely muscular action. The author found the muscle reaction in only 1 out of 4 animals; nor was it evident in animals with infundibulum injury, indicating that the expected metabolic changes would have taken place were it not for the presence of the drug. Calcium injection obviated the muscle reaction to physostigmine, except for the increased irritation; with magnesium, the reaction appeared immediately. Rabbits subjected to 33° C. did not respond to the drug muscularly until after warming. Hydrocyanic acid which as physostigmine, increases the lactic acid content of the muscles, produced with an inferior dose of physostigmine, a definite but premature muscle reaction which disappeared as prematurely. The fibrillation spasms and tonic phenomena after nerve incision were still evident several days after the administration of the drug in carnivora; they decreased in rabbits and guinea-pigs after the 4th day; in birds, immediately after the injection. With serious spinal cord incisions, the muscle manifestations disappeared at the latest on the 5th day. It is believed that a relation exists between the physostigmine action and the increased lactic acid value in the muscles. As for the interpretation of the muscle reaction of physostigmine poisoning, the author gives evidence to the support of the hypothesis that the reaction is not due directly to the poisonous effect of the drug but, indirectly, to the changes in metabolism. For example, the muscle response appears 20–22 minutes after the administration of the drug. Already in 10–13 minutes the animal shows not only excitation but the effects of light percussion and severe convulsions and rigidity; yet when the muscle is examined kymographically at this time there is scarcely anything of significance to be noted.—J. P.

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[1] JOUR. A. PH. A., 16 (1927), 561.

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

H. M. Lerou, President, Norwich, Conn. J. W. Gayle, Treasurer, Frankfort, Ky. M. N. Ford, Chairman of Executive Committee, Columbus, Ohio. H. C. Christensen, Secretary, 130 N. Wells St., Chicago, Ill.

ACTIVE MEMBER STATES.

Alabama	Indiana	Montana	Rhode Island
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Connecticut	Maine	New Mexico	Utah
Delaware	Maryland	North Carolina	Vermont
D. of Columbia	Massachusetts	North Dakota	Virginia
Florida	Michigan	Ohio	Washington
Georgia	Minnesota	Oklahoma	West Virginia
Idaho	Mississippi	Oregon	Wisconsin
Illinois	Missouri	Pennsylvania	Wyoming

MEETING OF DISTRICT NO. 3.

District No. 3 (Illinois, Indiana, Kentucky, Michigan, Ohio and Wisconsin) reports a very successful joint meeting with the college faculties on April 23rd–24th, at the Hotel Statler, Detroit, Michigan. President Lerou of the N. A. B. P. was guest of honor, stopping off on his way to the central office in Chicago. Representatives were present from every state in the district, both for the boards and the colleges.

Dean Edward H. Kraus, of the University of Michigan, spoke on "The Trend of Pharmaceutical Education," the discussion being led by C. O. Lee, of Purdue. Dean Edward Spease of Western Reserve University presented a paper on "The New Four-Year Course in Respect to Standards for Recognized Schools of Pharmacy," Dean Day of the University of Illinois opening the discussion. Many helpful ideas for outlining the four-year curriculum were given in these papers and the discussions following.

Each state board presented an examination paper on an assigned subject and these questions were read and thoroughly discussed. A number of resolutions were adopted, among them being one recommending the appointment of Dr. James H. Beal to the Fact-Finding Committee on Prohibition to be appointed by President Hoover.

DIPLOMA DATES.

In a few states, the Board of Pharmacy holds its June examination just a few days prior to the time set for college graduation, in order that the seniors may take examination before scattering to their homes all over the state. When the class is not too large, the Board announces the results and issues licenses immediately, which in some cases bear a date prior to the time of issue of the college diploma, which is, of course, the official date of graduation.

It is commendable for the Board to give consideration to the convenience of the students, but when this is done, great care should be exercised in the issuance of the state licenses by delaying the same until after official graduation. If this is not done, the student is not technically a graduate at the time his license is issued to him and, therefore, is barred from reciprocity with college prerequisite states in later years, because of the fact that he could not meet the entrance requirements (*i. e.*, college graduation) on the date of his original license to practice pharmacy.

This is published as a reminder to state board secretaries and members. If your examination this year will be given prior to the college commencement exercises, or prior to the issuance of the college diplomas, please see that state licenses are withheld until after that time and show a later date.

PERSONALS.

Arthur G. Hulett, N. A. B. P. Vice-President and Chairman of District No. 9, retired as secretary of the Arizona Board of Pharmacy on April 9, 1929. He had served as a member and secretary of the Board for twenty-six years, from the time when the pharmacy law went into effect in 1903.

His interest in pharmacy has not, however, been limited to his own state. He has been very prominent in the national association activities as well. Mr. Hulett was also one of the leaders in forming the Arizona Pharmaceutical Association and has served as its secretary since its organization, with the exception of a brief period of a few months when he insisted upon retirement but was pressed back into service when his successor found it impossible to carry on. He has been elected as delegate for that body to attend the Rapid City Convention in August, and his N. A. B. P. friends will be glad to welcome him.

Mr. Hulett now expects to devote all his time to his own business and especially to building a national demand for the preparations which he manufactures. After having unselfishly given up much of his time for the betterment of pharmacy, he merits success and has our hearty good wishes.

The new secretary, Arthur L. Phelps, is highly competent and energetic and will undoubtedly make good as Mr. Hulett's successor.

Visitors.—The central office was unusually fortunate this month. Our President, **H. M. Lerou,** made an official visit; the same day Secretary Harry E. Eaton of the Iowa Board called. Our old friend, ex-president and member of the Executive Committee, W. P. Porterfield of the North Dakota Board, stopped in on his way from his Gulf Coast winter sojourn to his summer home in North Dakota. Clare Allen, a member of the Michigan Board, also stopped in a while on a day's visit to the big city. John A. J. Funk, of Indiana was with us for a few hours to plan the District No. 3 program for the Detroit meeting.

STATE BOARD AND LEGISLATIVE NEWS.

Alabama.—The principal interest is still the relief of the flood sufferers in Southeastern Alabama. Manufacturers and jobbers are coming to the rescue nobly. The special fund for the druggists who lost everything is growing and will mean much in reëstablishing them in business.

The Board of Pharmacy will meet in Huntsville, Ala., June 10th and 11th, just prior to the state pharmaceutical association convention at the same place.

Reciprocal registration was granted during April to Roy S. Snellgrove and William S. McDiarmid, of Georgia; William H. Cook, Jr., of Tennessee.

Arizona.—The recent re-organization of the Board gives the personnel as follows: *President,* F. W. Ritter, Phoenix; *Vice-President,* H. B. Laird, Globe; *Secretary-Treasurer,* Arthur L.

Phelps, Phoenix; J. A. Dines, Tempe; E. M. F. Ivey, Warren; Marshall J. Nicholson, Willcox; Fred W. Moore, Flagstaff.

Arkansas.—A pharmacy law has recently been passed containing a list of definitions of pharmaceutical terms, amending the existing law, and regulating the sale of poisons.

Reciprocal registration was granted during April to S. R. Hambleton, of Tennessee, and D. Ingram, of Georgia.

Colorado.—An examination was held in the legislative chambers of the State Capitol Building, Denver, May 17th and 18th. Results will be announced later.

The thirty-fifth annual report of the Board for this fiscal year ending July 2, 1928 shows sixty pharmacists registered by examination during that period and thirty-eight by reciprocity. Examination questions are published in full, also lists of pharmacists and assistant pharmacists in the state, with license numbers, addresses, also lists of apprentices and registered pharmacies, as well as a complete copy of the pharmacy law.

Reciprocal registration has recently been granted to Verner H. Knight, of Indiana; Harry B. Shaffer and John H. Moffat, of Iowa; and W. R. Olive, of New Mexico.

Connecticut.—Reciprocal registration has recently been granted to Sanford Marks, of Maine; John B. Healey, Achille Huard and Carl A. E. Almstrom, all of Massachusetts; David Svigals, of New Jersey; and Roy W. Chase, of Vermont.

Delaware.—Four out of eight candidates who took the April examination for pharmacist were successful, and three out of six in the assistant class passed. Reciprocal registration was granted to Julius Segal, James A. Warnick and S. M. Leoncavallo, all of Pennsylvania.

The Senate bill amending law was passed by the legislature without a dissenting vote and signed by Governor C. Douglas Buck on March 3rd. The bill increases the examination fee for *pharmacist* from ten to fifteen dollars and *assistant pharmacist* from five to ten dollars. It also substantially increases the salaries of the members of the Board of Pharmacy.

District of Columbia.—Reciprocal registration was granted in April to Jerome S. Wolf, of Georgia; Thomas M. Swaun, of Kentucky; Charles C. Weinstein, of Maryland; John R. Gary, of North Carolina and Abraham B. Nathanson, of Pennsylvania.

Illinois.—Reciprocal registration was granted recently to Melvin B. Schwartz, of Ohio.

Indiana.—The annual meeting of the Board was held on April 9th, the following officers being elected: *President*, John A. J. Funk, Galveston; *Secretary*, Charles E. Reed, of Winchester.

The joint annual meeting of the Board members and deans of colleges of pharmacy was held on April 10th, and many important matters pertaining to pharmaceutical education which were of interest to both the Board and the colleges were discussed.

Reciprocal registration was granted to Charles C. King, of Pennsylvania.

Iowa.—Out of the class of twenty-two taking the Board examination on March 21st, eight were successful and have been granted licenses.

Reciprocal registration was granted in April to Charles D. Flannery, of South Dakota.

Kansas.—Roy M. Riley, of Wichita, has been appointed to succeed Joe Demain, of Macksville whose term expires in June. Frank A. Milne, of Pratt, has been appointed to fill the vacancy on the Board created by the recent resignation of P. H. Klinkenberg, of Ottawa.

The complete report of the examination held in Wichita on February 6th and 7th, shows a total of seventy-five candidates. Of the thirty taking the full registered examination, thirteen were successful; of the forty-five taking the assistant test, eighteen passed.

Kentucky.—At the examination meeting held in Owensboro on April 9th, a class of twenty candidates was examined. Out of the eleven taking the full registered examination, three passed: of the nine taking the assistant examination, six were successful.

Reciprocal registration was granted to Halle S. Flournoy, of Alabama; and W. Howard Owen, of Missouri. The next meeting of the Board will be held in Louisville on July 9th.

Maryland.—The next examination will be given at the College of Pharmacy of the University of Maryland on June 4, 5, 6, 1929, commencing promptly at 9 o'clock each morning.

Reciprocal registration was granted during April to Henry C. Hardy, of the District of Columbia, and Joseph T. Waters, of South Carolina.

Massachusetts.—Out of a class of 58 examined on March 5th, twenty-two were successful and have been granted licenses as pharmacists.

Reciprocal registration was granted during April to James J. Jennings, of Rhode Island, and Thomas C. Mishon, of Maine.

Minnesota.—At the April 18th examination, thirty-seven candidates were examined for pharmacist's license, seven passing, and thirty-one for the assistant license, of whom ten were successful.

Reciprocal registration was granted to the following: John T. Dardis and Alfred Excog, both of Iowa; N. J. Pietrus, of Nebraska and H. P. Stuewer, of Wisconsin.

Missouri.—The next examination will be held June 17th and 18th. For further information and application blanks, please write direct to E. H. Riske, Secretary, Independence, Mo.

Reciprocal registration was granted to Allen P. Whipple, of Georgia, in April.

Nebraska.—The next pharmacy examination will be given June 18th to 21st inclusive at the Creighton College of Pharmacy, Omaha.

Under the new rule recently adopted by the Department of Public Welfare, students who have completed three or more years of work at a recognized school of pharmacy may take a partial examination (all subjects except oral and practical work). Credit is held until final examination, which is permissible when experience, age and all other requirements have been completed, provided, however, that the final examination must be taken within two years from date of first part of examination.

Nevada.—H. H. Turrittin, of Reno, is serving as Acting Secretary of the Board until the next meeting to be held on May 6th. F. M. Clark has left the drug business and is therefore unable to continue as secretary. Reciprocal registration was granted recently to Raymond Howard, of Massachusetts.

New Hampshire.—Reciprocal registration was granted to Donald F. Melcher, of Maine, during April.

New Jersey.—The Board of pharmacy announces that the next written examination for the registered pharmacist certificate will be held at the State House, Trenton, on July 18th at 10:00 A.M. The next examination for the assistant pharmacist certificate will be held at the same place on Friday, July 10, at 10:00 A.M.

Reciprocal registration was granted during April to the following: James R. Altman, of Ohio; Harry B. Axilbund, George H. Platt, William F. Usher, William McCouch and Joseph F. Kennedy, of Pennsylvania.

New Mexico.—The law has been amended to make the examination fee $15.00 instead of $10.00; the section providing for registration on twenty years of experience without examination has been repealed. The spring examination was held at the Franciscan Hotel, Alburquerque, May 20th. Results will be announced next month.

North Carolina.—The next meeting of the Board of Pharmacy for the examination of applicants for license to practice pharmacy will be held at Chapel Hill, N. C., June 11, 1929, at nine o'clock A.M., in the Pharmacy Building. For blanks or information write to F. W. Hancock, Secretary-Treasurer, Oxford, N. C.

Reciprocal registration was recently granted to Henry G. Heriot, of South Carolina and James H. Kirby, of Georgia.

North Dakota.—The next meeting of the North Dakota State Board of Pharmacy will be held at the School of Pharmacy, State College, Fargo, June 11th to 13th, for the purpose of examining applicants for registered pharmacist and assistant pharmacist and considering any other business to come before the Board. Address all applications and communications to P. H. Costello, Secretary, Cooperstown, N. D.

Ohio.—Governor Cooper has re-appointed F. H. King, of Delphos and J. S. Rutledge, of Akron, members of the Board of Pharmacy. Mr. King was reappointed by Governor Donahey in March 1928, but as it was a recess appointment, his name was returned to the new governor, who re-appointed him for a term ending March 31, 1933. With the completion of this term, Mr. King will have served thirty-five consecutive years as a member of the Ohio Board. Mr. Rutledge's appointment expires March 31, 1934.

The legislature has passed the bill providing for the discontinuation of the *assistant pharmacist* examination. Therefore, the June examination will be the last one for assistants, provided the Governor permits the bill to become a law.

Ninety-two candidates were examined at the April meeting. Results will be announced shortly.

Reciprocal registration was granted in April to the following: Paul B. Redmon, of Indiana; Charles Z. Erdman, Jr., of Massachusetts; Gordon Kohls, of Michigan; James R. Smith and Alex C. Goodman, of Pennsylvania; and James H. Staley, of West Virginia.

Oklahoma.—Reciprocal registration was recently granted to W. L. Kolb, of Arkansas; Charles B. Shull, L. E. Oxelson and W. R. Rickel, of Kansas; M. J. Plessala, of Louisiana; W. B. Elmore, of Missouri; R. L. Tschauner, of Nebraska; Wm. H. Canaday, of North Carolina; Ralph L. Turner, of Tennessee and Estes E. Daugherty, of Texas.

Oregon.—Reciprocal registration was granted in April to Wesley D. Kessler, of Washington.

Pennsylvania.—Senate Bill 258, sponsored by the Pennsylvania Pharmaceutical Association, passed the Senate and the House of Representatives and was approved by the Governor on April 9, 1929.

The act amends the Pure Drug Law so as to make it illegal to sell drug preparations which are recognized in the 10th revision of the U. S. P., the 5th edition of the N. F. or the American Homeopathic Pharmacopœia, which differ from the standard of strength, quality or purity as determined by the test or formula laid down in those official standards. The act will become effective July 1, 1929.

Four bills containing features detrimental to pharmacy were killed through the efforts of the Association. Reciprocal registration was granted recently to Thomas R. Adams, of Illinois.

Rhode Island.—The Governor has re-appointed William R. Fortin, of Pawtucket and Earl H. Mason, of East Providence, as members of the Board of Pharmacy for terms ending January 31, 1933.

An examination was held on March 18th. Of the eighteen candidates appearing, seven were successful in passing.

Reciprocal registration was granted to Frank J. Logler, of Massachusetts.

Tennessee.—Reciprocal registration was granted during April to the following: B. D. Brown, of Arkansas; Thomas K. Merritt, Harry D. Stewart, Hubert C. Chandler and Marcus H. Griffin, all of Georgia; Samuel S. Brown, of Oklahoma; James A. Null, of Pennsylvania and F. W. Irish, of Wisconsin.

Texas.—The date on which the college prerequisite law takes effect is given as June 18, 1929.

Reciprocal registration was granted during April to the following: James M. Foster and Stephen D. Knox, both of Arkansas; William O. Hearn, of Illinois; Francis E. Mayeux, of Louisiana; James V. Cockrum, of Missouri; Francisco A. Hernandez, of New Mexico; Robert E. Chitwood, Walter J. White, J. B. Nicks, J. R. Rossiter, Roy Aubrey and Albert J. Varvel, all of Oklahoma; Charles W. Gibbs, of Rhode Island; Marvin L. Griner and George D. Nicks, both of Tennessee; Daniel W. Houser, of Kansas and James O. Curtis, of Georgia.

Virginia.—The annual report of the Board of Pharmacy is published in the April 1929 issue of the *Virginia Pharmacist*. Twenty-six candidates for full registered license were examined during the year, nineteen passing. Fifty-six "assistant" aspirants were also examined, of which number, twenty-four passed. Seven applicants from other states were registered by reciprocity. In addition to the usual information concerning the business affairs of the Board, the issue contains a complete list of pharmacists and assistants registered in the state, with addresses.

Reciprocal registration was extended during April to William W. Chandler, of Maryland; Charles J. Wartman, of North Carolina; Joseph E. Ledford, of Georgia.

West Virginia.—An examination was held in Morgantown on May 20th–21st. Results will be given later. Reciprocal registration was granted to Wesley G. Donegan, of Tennessee recently.

Wisconsin.—The quarterly examination was concluded on April 20th, after examining 190 candidates. Of this number, 76 were successful—39 receiving the *pharmacist* license and 37 the *assistant*. Reciprocal registration was granted to Randall H. Greeley, of New Hampshire.

This being the annual meeting of the Board as well, Oscar Rennebohm of Madison, was elected *President* and Henry G. Ruenzel, of Milwaukee, was reëlected *Secretary*. The next examination will be held in Madison on July 16th.

Wyoming.—R. C. Shultz, of Worland, Wyo., formerly president of the Board of Pharmacy, has been made secretary to succeed C. C. Tomsik, of Sheridan.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

CORRELATION OF MANUFACTURING PHARMACY ASSIGNMENTS AND DIDACTIC CLASS-ROOM INSTRUCTION.

BY FERDINAND D. STOLL.*

At the time when Prof. Adley B. Nichols sent out his questionnaire soliciting topics for discussion during the Manufacturing Pharmacy Seminar, I responded by submitting the title of this paper. My attitude was inquisitive and I had little expectation that it would befall my lot to assume a didactic rôle on the subject. As it is, I am still inquisitive on this theme and I confess at the start that my prime motive is to precipitate a discussion and thereby learn how other instructors correlate their laboratory assignments with didactic instruction—and to receive suggestions which will lead to better results among the student body of our colleges of pharmacy.

In a perusal of the catalogs of many of the colleges of the ASSOCIATION, one will note that the courses in the various branches are established as definite standardized and numbered courses—and that a certain number or group constitute a session of work for the student. In other catalogs, such as that of the Louisville College of Pharmacy, the courses are described to the reader in general terms indicating the nature and scope of the sessions' work but are neither numbered nor divided into semester hours or periods. Neither variety of catalog imparts any real clues to the correlation of the subject matter of Manufacturing Pharmacy and Didactic Pharmacy periods. And it is my sincere belief that the maximum benefit will accrue to student, instructor and college only if Manufacturing Laboratory assignments and Didactic Lectures are correlated.

At the time when the two-year course was in vogue in our College, the Manufacturing Pharmacy laboratory course was largely a course separate and distinct from the Didactic Course in Pharmacy, and consisted of a total of two $3^1/_2$-hour periods per week for thirty-two weeks. Such preparations or types as suggested in the Syllabus were made by the classes and during these periods the instructor frequently found it possible to incorporate much didactic instruction regarding the preparations manufactured in the Laboratory. In thus doing, it was possible to devote less time to lectures on these same preparations and to utilize the time saved for either a consideration of more National Formulary preparations or for mention of newer developments in theoretical and practical pharmacy.

The adoption of the three-year course called for a revision in the programs of practically every department at each college making the change. Our Syllabus, while it outlines a minimum course in Pharmacy, allows each college to arrange the courses and to extend beyond the minimum in a manner that best suits the needs, desires, class schedules and resources of the college.

In modifying and extending the Pharmacy Course from two years to three years the students were given much new material in Manufacturing Assignments,

* Louisville College of Pharmacy.

while in the lecture schedule it was found desirable and possible not only to include new material, but also devote more time than formerly to Theoretical Pharmacy, Mathematics and consideration of U. S. P. and N. F. preparations. Freshman "Manufacturing Pharmacy" was modified to include actual work in Physical Pharmacy, *viz.:* Metrology, Specific Gravity, Specific Volume, Melting Point, Boiling Point and Solubility determinations during the first portion of the course or session, while, at the same time, these subjects were presented and explained in the lecture periods. Following Physical Pharmacy, students began making the more simple types of preparations such as Aromatic Waters, Infusions, Decoctions, Vinegars, Mucilages, Liniments and U. S. P. Emulsions while, the Didactic periods paralled this work with a discussion of the preparations made, the types they represent, the theories embraced and the manipulations involved. Notes taken in lecture periods amplified laboratory work, and laboratory assignments afforded practical application of principles expounded in lecture room. Theory and practice were closely correlated.

Junior Didactic instruction is devoted to a consideration of the U. S. P. and N. F. preparations, while the Manufacturing assignments call for the making of preparations recommended by the Syllabus and which have been recently mentioned in Didactic class-room work. Senior work follows along the plan of the Junior but involves the study and manufacture of more difficult preparations.

In framing the Freshman class schedules, Didactic and Manufacturing periods were so arranged that Didactic periods preceded the Laboratory, so that operations or preparations discussed in the lecture room could be demonstrated or made in the Laboratory while the subject was still fresh in the students' minds. In Junior and Senior work, subject schedules were so arranged that didactic consideration of a preparation always preceded the assignment to make it. This, I think, is as it should be—not only in Pharmacy, but for Chemistry and Pharmacognosy as well. Then too, at the beginning of each Laboratory period a portion of the period is devoted to a brief didactic review of the preparations assigned, and to explain the working formula for special details to be observed or avoided.

In planning the schedules and assignments for the three-year course, every effort has been made to correlate Didactic and Laboratory subjects. The effort has been decidedly advantageous, the results gratifying. Many freshmen students found no little difficulty in mastering the mathematics of Metrology, Specific Gravity, Specific Volume and Thermometric conversions when presented in the class room alone—as was the method during the two-year course; but now, as has been my experience, the subject is more interesting and more readily understood when class-room work is correlated with actual assignments in the Laboratory. A student has a far better understanding of specific gravity and specific volume when he measures 50 cc. of glycerin into a graduate and finds that it weighs 62.5 Gm. and then determines the weight/volume or volume/weight ratio. Then too, if a student is given a turbid liquid mixture and is directed to pass it through gauze, then through cotton, finally through filter paper, he has a far better understanding of colation and filtration than if these topics were relegated to class-room lecture alone.

The more closely the Laboratory assignments follow class-room discussions, the more impressive to the student. The majority of students—especially those

whose experience has been in drug stores where little or no manufacturing is done—find it difficult to remember the ingredients and process for making many of the more important preparations; but when a group such as the **Liquors** is explained in class room one day and then some of these are prepared in the Laboratory soon after, the student learns and retains more information than if lecture and laboratory assignment were more disjointed.

In the study of U. S. P. and N. F. preparations it frequently happens that Didactic instruction runs ahead of Laboratory assignments. For preparations such as Tinctures, Fluidextracts, Fluidglycerates and Extracts, this is sometimes advantageous as it gives the student a better perspective of that particular class of products, so that when he actually prepares any one preparation assigned he has acquired a familiarity much to his advantage—does not follow directions so blindly.

To further correlate Manufacturing assignments with Didactic instruction, laboratory forms are used. The student is encouraged to bring to the Laboratory all lecture notes, and any supplementary text and to refer to them in connection with the preparations assigned; the object being to learn as much as possible about each preparation at the time it is actually being made, thus correlating theory with practical manipulations. The forms are saved as a laboratory notebook, and, as they accumulate, provide the student with excellent material for a *Review* of the subject. Samples of all preparations made are saved by the student as his collection and later in the session, these are used as a basis for an oral quiz.

To my mind it is highly desirable to correlate Manufacturing Assignments with Didactic Class-Room Lectures. It gives the student a more ready grasp on the subject through the close sequence of laboratory or manufacturing assignments following the didactic—correlation of theory and practice. In a session's time it saves class-room hours for the instructor and enables him to either review more extensively or to include new material. For the student it correlates the *Why* with the *How* before the student forgets the *Why*, and is there anything to be gained by teaching students *How* before the *Why?* It will also result in higher class scholarships and less failures—in the past three years at our College the Manufacturing was very popular with the students.

My attitude in reading this paper has been one of inquiry. I should like to know:

1. To what extent and in what manner do other Colleges correlate Manufacturing Assignments with Didactic Class-Room instruction?

2. In Manufacturing Pharmacy periods, how much time, if any, should be given to a didactic treatment of the preparations assigned?

ANOTHER PATIENT RELEASED FROM NATIONAL LEPROSARIUM.

Dr. C. C. Pierce, Acting Surgeon-General, of the Public Health Service, has authorized the release of another leper from the National Leprosarium of the Public Health Service at Carville, La. This is the fourteenth leper who has been released during the present fiscal year, from this institution.

The National Leprosarium at Carville, La., was established in 1921. Since that date 39 persons have been released as no longer a menace to the public health. Of this number, only one has been obliged to return to this institution for further treatment.

There are now under treatment in the National Leprosarium at Carville more than 300 lepers.

THE EIGHTIETH BIRTHDAY OF JOHN URI LLOYD.

During the week of April 19th, Cincinnati celebrated the eightieth birthday of John Uri Lloyd. Thousands of his fellow citizens, admirers and friends, not only in Cincinnati, but throughout the country, joined in the gladness of the occasion and in wishing him continued health, happiness and usefulness.

On Tuesday, April 16th, Professor Lloyd's birthday was particularly remembered at the monthly luncheon of the Veteran Druggists' Association of Cincinnati, which now is called the Veteran Apothecaries' Association of Cincinnati. Frank H. Freericks extended the congratulations and best wishes, not only of the Cincinnati Veterans, but of all the veterans throughout the country, and presented a wonderful birthday cake which had been baked for the occasion by Mrs. Freericks with the special reservation, as a right, that it be agreed she will have the same privilege for the next ten years on the annual birthday celebration of Dr. Lloyd. At the conclusion of his congratulatory remarks, Mr. Freericks, with the permission of President Greyer, instituted the Lloyd Clasp, which constitutes a joining of hands of all the veterans with Professor Lloyd in the center. The Lloyd Clasp hereafter is to be reserved for the birthday commemoration of Professor Lloyd and is intended to be a permanent institution throughout future years and generations of Cincinnati veterans, serving always as a reminder of him; thus making it possible that through the continuation of the veterans and installation of newer veterans, replacing those who pass away, there will always be a direct contact from the hands of John Uri Lloyd to the hands of all the rest, ever serving as a reminder of his unselfish devotion to humanity and to pharmacy, which have been enriched by his personality and existence.

JOHN URI LLOYD.

On April 18th, the eve of Professor Lloyd's birthday, his very intimate friends and admirers, including the outstanding leaders of Cincinnati and some national leaders in pharmacy, tendered him a Testimonial Dinner at the Cincinnati Club. It was agreed by all present to have been the most wonderful affair of its kind for a great many years. Arrangements for the dinner were in the hands of a small committee of the celebrants' friends, of which Mr. A. J. Conroy, possibly his very closest friend, was the chairman. It had been the thought to limit the informal invitations for the dinner to just fifty of the very closest friends, but the number had to be extended to practically one hundred, and thousands were disappointed that they could not also be present. Those who spoke and paid tribute to the greatness of the guest of honor and to the wonder of his unselfish work were A. J. Conroy, Dr. J. M. Withrow, Judge John Weld Peck, Editor E. G. Eberle, of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, Dr. Edward Kremers of the University of Wisconsin, Col. John L. Shuff. President Blackwell, of the Chamber of Commerce, presented a certificate of Honorary Membership in the body, an award very highly regarded by the citizens of Cincinnati, and, in conclusion, Leroy Brooks, Jr., son of the honored's most intimate lifelong friend, presented an heirloom of the family to Professor Lloyd.

In his usual kindly, modest way, the guest of honor expressed his appreciation for the congratulations and good wishes which had been showered upon him; he likened man in his usefulness and influence to those who surround and follow him, with a tree and its influence and usefulness as a father of other trees to come, in which the virtues and special qualities of the father tree are continued long after it has passed away.

In commemoration of the day a gold book, being a beautiful leather-covered, gold-em-

bossed book of the menu and list of speakers, containing the autograph of every invited guest, was presented to Professor Lloyd and each of the guests had as a memento of the occasion a copy of the book containing as an inscription a few written appropriate words over the signature of John Uri Lloyd.—*Contributed.*

Easily, this copy of the JOURNAL could be filled from cover to cover with what was said of Professor Lloyd and to him during a few hours of his birthday anniversary. No word was permitted to get into the newspapers of the contemplated celebration; otherwise no dining hall in Cincinnati would have been large enough, and the excitement probably would have been too much for the octogenarian. The friends, therefore, having the affair in charge were compelled to forego carrying out to the fullest extent the desire of their hearts.

We take the liberty of quoting two brief editorials of the Cincinnati Press.

"A BAREFOOT BOY."

"A barefoot boy dreamily roaming over the hills of northern Kentucky—with his eyes ever striving to look beyond the horizon. Sheep bleating plaintively when, swinging a crooked stick, he drove them to the stockyards.

"A patient, painstaking student spurred on by ambition and mother love. An errand boy in a drug store at $2 a week without board. A clerk, embryo chemist. A lovable tyrant as an instructor. Author, master of plant chemistry, discoverer, creator. The world's foremost authority on colloidal chemistry. Recipient of medals, prizes and testimonials. A man whose works and fame will live as long as pharmacy and chemistry are known—in short, an immortal.

"Here we have a vignette of the career of John Uri Lloyd, one of Cincinnati's greatest and most useful men, whose 80th birthday was celebrated by nearly 100 prominent citizens at the Cincinnati Club, Thursday night.

"Congratulations, John Uri Lloyd, citizen of Cincinnati and the world. We hope many more years of happy, useful living are in store for you."

"A DAY WE, TOO, CELEBRATE."

"When such a man as John Uri Lloyd celebrates the eightieth anniversary of his birth it is more than a personal event. It becomes a public matter. For it is men like Dr. Lloyd who teach us how to live. They combine quality with quantity of years. Mere longevity becomes an incident to the service they have done for their fellow men.

"Having lived for others, John Uri Lloyd has lived best for himself. Chemistry has been his vocation, and great has been his success therein, but Dr. Lloyd's avocations have given the real grace to his long line of years. Above all, Dr. Lloyd has been a man of great humanitarian spirit. He has been deeply interested in his fellow men and he has greatly labored for his fellow men. But a nature so full must overflow. Mere deeds do not suffice to give adequate expression. So the hand of practical accomplishment took up the pen and found therein an outlet for imagination and kindly spirit. The result was the fanciful Etidorpha and the very human Stringtown on the Pike, a novel that has become recognized as one of the several books that truly interpret American life of another day.

"This world has been a vast laboratory in which Dr. Lloyd has conducted a great experiment, his own life. We congratulate him upon its consummate success. He has realized the ambition of the medieval alchemist. He has transmuted the dross of life into pure gold."

ORIGIN OF CAMPHOR IN CAMPHOR TREES.

Chemical examination of different parts of the camphor tree at various stages of growth shows that the formation of camphor, and of the essential oil of which it is the chief constituent, takes place in the earliest stages, in nearly all tissues in active growth, especially just beneath the cambium. The sap contains no appreciable amount of camphor. The rate of formation of camphor and oil approximates to that of the growth of the tree. The more vigorous the growth the more rapid is the formation of camphor. When once formation of oil is started in the cell it proceeds rapidly until the cavity is filled. The cell lining has been shown to contain an enzyme, a peroxidase. There appears to be the active agent in the formation of the oil. It disappears when the cell is full of oil. This peroxidase lining has been found in the cells of other essential oil-bearing plants.—T. Yahagi (*Jap. J. Chem.*).

SEVENTH ANNUAL MEETING OF THE PLANT SCIENCE SEMINAR.

Custer State Park, Rapid City, South Dakota, August 19th (10:00 A.M.) to August 23rd (at Noon), 1929.*

Dr. C. C. O'Harra, president of the South Dakota State School of Mines, of Rapid City, has announced the selection of the Game Lodge in Custer State Park as the camp site for the gathering of the members of the Plant Science Seminar, who will hold their annual meeting there the week of August 19th, just preceding that of the AMERICAN PHARMACEUTICAL ASSOCIATION, which will be held at Rapid City the last week of the month.

The State Lodge itself will not be available except by arrangement long in advance. However, the management having charge of the Lodge has also other facilities which will be available. These consist of tent-cabins with board floors and walls with canvas roofs, and are clean and comfortably furnished. Meals are to be secured at the Lodge, or the Inn close at hand.

Deadwood Dick himself, famous, both in fact and in fiction. He will be on hand for the convention.

The camp is on a main highway, where weather conditions will not interfere with travel; it is of especial interest because of its having been, for a time, the Summer White House, and it gives access by means of the fine Needles Highway to the Sylvan Lake and Harney Peak district, which is some of the finest scenery in America. Perhaps no other place in the Black Hills can show, with as little trouble, such a wide variety of wild plant life as may be seen on several trips that may be easily taken. In addition to all this, it is only thirty-two miles from Rapid City, and connections are made by regular lines of automobile buses.

Officers of South Dakota Pharmaceutical Association, 1902. The late Secretary, E. C. Bent and President of the A. PH. A., D. F. Jones, are shown at the right in the picture.

Mr. and Mrs. C. C. Gideon, superintendents of the Lodge, are cultured people, and have the name of giving careful and close attention to visitors' requirements.

C. E. F. Mollett, of Missoula, Mont., is chairman of the Seminar, and O. P. M. Canis is the secretary. The latter may be addressed at Ozone Park, Long Island, N. Y. Arrangements for tent-cabins and rooms should be made with Mr. C. C. Gideon, superintendent of the Lodge.

The arrangements made by Dr. C. C. O'Harra and President D. F. Jones are as follows: Tent-cabins for one, per night, $1.50; for two, $2.00; for three, $2.50. Rooms and board in State Lodge are $1.75 to $2.50 for single room per day; with bath (limited number) $4.50. All rooms have hot and cold running water. Meals at Lodge: Breakfast, 50 cents; dinner and supper, each 75 cents. Those occupying tents may obtain regular "short-order" meals at the Inn.

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* The information given is from a bulletin issued by the Publicity Committee of which George A. Bender of Watertown, S. Dak., is the chairman. Each issue of the JOURNAL will bring to its readers interesting messages from the wonderland of America.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

ARTICLE III of Chapter VII reads: "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it.* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association."

ARTICLE IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meetings of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly and manuscript should be signed by the reporter.

BALTIMORE.

On Friday evening, April 19, 1929, the students of the School of Pharmacy of the University of Maryland ably demonstrated their versatile ability in the field of chemical theatricals by producing a very creditable Chemistry Show, which was given in the Auditorium of the New Western High School of Baltimore, and enjoyed by some 1500 friends and guests.

The members of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION and of the Baltimore Retail Druggists' Association were special guests, and the faculties and students of the science departments of the different colleges and high schools located in or near Baltimore were also invited and represented in the audience.

The guests were welcomed by Dean A. G. DuMez, of the School of Pharmacy, who stated that the purpose of the Chemistry Show was to further the interrelated interests of pharmacy and chemistry in entertainingly presenting some interesting and unique phases of chemistry.

Dr. E. H. Vanden Bosche, Assistant Professor of chemistry, directed the Chemistry Show, Earle M. Wilder was General Chairman of the Committees, and Mr. Thomas Fulton was Master of Ceremonies. Music for the occasion was provided by the Orchestra of the School of Pharmacy, under the inspiring direction of Salvatore Molinari.

Act I, "A Night in Alchemy," was spectacularly presented, with Hugh B. McNally as "Subtle," the Alchemist; Louis Sherman as "Lungs," the Varlet; and Justin Deal as "Gobo," a Wanderer.

The Magic Trio, composed of W. Lester Brunnett, Thomas Gorban and T. Gorsuch Wright, elicited continued surprise and wonder, in Act II, as they presented their bewildering chemical magic.

Act III was instructive as well as entertaining. Dr. M. M. Haring, Professor of Physical Chemistry, assisted by Milton R. Stein, demonstrated the Properties of Liquid Air by many and varied experiments.

The concluding Act IV was the lighter farcical presentation of a treatise on water, "All Wet," by I. E. Kerpelman, the monocled English Professor Pineas T. Vacuum, assisted by Max Ansell as "Herr Tonic." Professor Vacuum repeatedly attempted to profoundly prove that water was a colorless liquid, but his attempts were continuously unsuccessful, as every experiment he undertook resulted in producing a liquid of a different color.

Vocal, violin and piano solos were rendered between the acts by Hugh McNally, Herman Mendelsohn and Salvatore Molinari; and a reading, "The Chemist," was given by Miss Jeannette R. Heghinian.

The interest of the pharmacists and business men of Baltimore was demonstrated in their friendly coöperation in financing the printing of the program for the occasion.

In recounting the benefits derived from the "Chemistry Show" the students of the School of Pharmacy are convinced that the college spirit has been enlivened and strengthened;

that pharmacists and friends were pleasingly, as well as instructively, entertained; and that those who participated have a keener conception of the results that may be secured by organized effort, as well as a better understanding of some chemical reactions. It was a big undertaking which proved to be a signal success.

CHICAGO.

The 182nd meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held April 16th at the University of Illinois School of Pharmacy.

President Lindahl opened the meeting by announcing that Dr. A. J. Cramp who was to speak on "Patent Medicines and the Public" could not be present as he had been unexpectedly called out of town. However, Dr. S. M. Gordon very kindly offered to substitute for Dr. Cramp. Dean W. B. Day was called upon to introduce Dr. Gordon, who spoke on "The Plant Chemistry of Peppermint."

Dr. Gordon gave an excellent résumé of work done on the analysis of peppermint and the oil. Seventeen different compounds have been isolated from peppermint. Menthol and menthone exist together in different proportions, there being some difference of opinion regarding the changes between these. The formation and chemical changes occurring in the plant were graphically presented, showing that the plant is a most remarkable chemical laboratory in itself.

Mr. Holthoefer, secretary of the Chicago Retail Druggists' Association, gave a short talk on the propaganda to be carried on by the Chicago Retail Druggists' Association in order to stimulate greater use of U. S. P. and N. F. preparations in place of patent medicines.

S. W. MORRISON, *Secretary.*

DETROIT.

The April meeting of the Detroit Branch of AMERICAN PHARMACEUTICAL ASSOCIATION was held at the Y. M. C. A. Building, Thursday, April 18, 1929. The meeting was preceded by the usual excellent dinner.

In the absence of President Byce, Mr. Robson of the Council of Students of the Detroit College of Pharmacy presided. The minutes of the previous meeting were read by the Secretary and approved.

A communication from Dean Kraus, of the University of Michigan, was read, inviting the Association to hold the May meeting at Ann Arbor. He also announced that an interesting program had been arranged for the evening.

Mr. Robson then introduced H. L. Baker, the first member on the Detroit College of Pharmacy program, who spoke on "Pharmacy Corps in the Army." He recommended that strong efforts be made to support the movement for recognition of pharmacists in the United States Army.

A general discussion followed, in which Dean Stout said that this was the first step for the recognition of pharmacy. Dean Lakey said the recognition of pharmacy by different countries is given according to the standing of the profession, but this country is now endeavoring to raise the standards of pharmacy and secure rightful recognition for it in the Government Service.

The next speaker was Jesse Hatch, whose subject was the "Four-Year Pharmacy Curriculum." Mr. Hatch emphasized the need for a four-year course in pharmacy to raise the standards of pharmacy and the caliber of the men entering same.

In discussing the question, Mr. Ellis, member of the senior class, said the three-year curriculum does not allow for cultural background; he stated that even a four-year course is insufficient. Professor Crandall, of the Detroit College of Pharmacy, said the benefits of the extended curriculum are very noticeable, that longer courses in pharmacy are bound to bring up the standards of the profession.

The next speaker was R. L. Jones, who gave an illustrated talk "From Cheops to the Neighborhood Drug Store—Progression or Retrogression." Mr. Jones gave a very interesting talk on ancient pharmacy and the progress made by it up to the present time.

Dean Lakey then announced he had three motions to make; they follow:

That the Secretary send a letter of condolence to the members of the family of the late John J. Mitchell, who had been an outstanding figure in Detroit pharmacy for nearly 50 years. Mr. Mitchell had conducted the only homeopathic pharmacy in Detroit.

Secondly.—That the Secretary send a letter of congratulation to one of our loyal members, Wilbur L. Scoville, who has just received the highest honor and recognition for a pharmacist, the Remington Medal.

Thirdly.—A rising vote of thanks to the Detroit College of Pharmacy for their splendid program, which Dean Lakey emphasized was the best Student Program presented before the Detroit Branch.

The motions were seconded by Dean Stout and supported by the entire assembly.

BERNARD A. BIALK, *Secretary.*

PHILADELPHIA.

The April meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was called to order by President Quintus Hoch, Tuesday evening the 9th, at the P. A. R. D. Building, 2017 Spring Garden Street.

The secretary read the minutes of the March meeting which were approved. The membership of the standing committees was then announced by the secretary.

Practical Pharmacy.—Charles T. Pickett, *Chairman;* Ambrose Hunsberger, W. W. McNeary.

Membership.—L. G. Penn, *Chairman;* Adley B. Nichols, H. Mattisow, George E. Byers, B. C. Goodhart.

Professional Relations.—Dr. Wilmer Krusen, *Chairman;* Dr. John R. Minehart, John Woodside.

Entertainment.—J. W. E. Harrisson, *Chairman;* R. Hendrickson, *Vice-Chairman;* J. J. Kelly, C. Louis Seip.

The following applications were received and accepted pending their acceptance of membership by the parent organization: Arthur K. Leberknight, Philadelphia; William Austin Kelly, Philadelphia; Hugo Rieve, Philadelphia, and James C. Mayers, Philadelphia. The application of F. B. Seibert was presented and he was accepted as a contributing member.

The speaker of the evening, Dr. C. W. Brown, was presented by President Hoch. Dr. Brown has been associated with the H. K. Mulford Company for a number of years and has had a wide experience in the field of biologicals. He selected as his topic for the evening "Biologicals," which he discussed from many sides.

He opened his lecture by discussing a number of outstanding historical facts such as the discovery of the microscope and the first identification of bacteria. These discoveries led to other fields, and the work of Pasteur and other famous scientists laid the foundation for our present-day science of biologicals.

Dr. Brown discussed the preparation of vaccines, antitoxins, tonin-antitoxins, serums, bacterins and the other biologicals in common use to-day. Some of these require several months to prepare while others require almost a year. Years of experimenting have resulted in products of the highest character and potency. He also described the testing, preservation and methods of distribution which play so great a part in this great industry.

Near the end of his lecture Dr. Brown briefly described the preparation and use of Antivenin. This antitoxin is prepared from the venom of the three poisonous North American snakes: the rattlesnake, the copperhead and moccasin. When used in time, it is certain to save the lives of individuals poisoned by any one of these snakes.

A very excellent series of slides were used to demonstrate the entire lecture. The lecture was closed by a brief discussion on the subject of "Pollen and Pollen Extracts." Slides were shown to demonstrate how diagnostic tests are made and the positive and negative results of diagnostic tests were shown.

Following Dr. Brown's closing remarks the members joined in a general discussion, after which Dr. Brown was given a rising vote of thanks.

Preceding the meeting a dinner was served to a group of the members and their friends in the dining room of the P. A. R. D. Building.

FRANK H. EBY, *Secretary.*

PITTSBURGH.

The Pittsburgh Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION met at the Pittsburgh College of Pharmacy, Tuesday, April 16, 1929. President Rees presided; the minutes of the previous meeting were read and approved.

President Rees reported for the Committee on Program. Arrangements are being completed by Professor C. L. O'Connell to hold the final meeting of this school year at Webster Hall.

Since there was no further business the President presented Dr. L. K. Darbaker, who completed the series of illustrated lectures on "Plant Life." His presentation was very enjoyable. Comments were made by Dr. J. H. Wurdack and others. A vote of thanks was accorded Dr. Darbaker.

F. S. MCGINNIS, *Secretary.*

MAY MEETING.

The Third Annual Dinner of the Pittsburgh Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION will be held in Webster Hall on Wednesday evening, May 8th. Dinner will be served in the main dining room at 6:30 P.M. Ladies are invited to attend.

The Pittsburgh Veteran Druggists' Association will attend as a body and hold its meeting on the same evening.

The program will be given by the students of the Pittsburgh College of Pharmacy, School of Pharmacy of the University of Pittsburgh. It will consist of the presentation of original essays prepared by the students upon subjects pertinent to pharmacy.

C. LEONARD O'CONNELL, *Chairman*,
Committee on Arrangements.

UNIVERSITY OF WASHINGTON.

The annual dinner of the University of Washington Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was given on February 27th at the American Legion Hall. The speaker of the evening was Dr. Horsfall, who talked on "The Relation Between the Doctor and Druggist." The annual pharmacy play, written by Miss Radford of the Chemistry Department for this occasion, was presented by students in Pharmacy. This play, entitled "Try the Druggist First" was humorous though somewhat true. However, it is to be hoped that no one druggist was "tried" so many times in a single day. Music was furnished by the student orchestra. Other numbers on the program were tumbling, dancing and singing acts presented by local talent. One hundred and fifty were present at the dinner.

The March meeting was held March 7th, the early date being necessary because of coming quarter examinations. No formal program was offered. Election of officers took place with the following results:

President, Earl Guth; *Vice-President*, Einar Johnson; *Secretary*, H. A. Langenhan.

The Branch is looking forward to a talk from Dean Lyman of the University of Nebraska who will be the speaker for the April meeting.

H. A. LANGENHAN, *Secretary*.

COMMITTEE REPORTS

COMMITTEE ON STANDARDS OF DRUGS AND CHEMICAL PRODUCTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

BULLETIN I—1928–29.

BY E. N. GATHERCOAL, *Chairman*.

(*Concluded from p. 416, April Issue.*)

EXHIBIT "A."

An address presented by Dr. J. H. Beal to the Council of the A. Ph. A. at the Hot Springs meeting, 1908—

The present nation-wide movement for certainty of quality and honest labeling of products which by their nature are subject to adulteration and sophistication is not temporary or spasmodic, but is the result of the slow accumulation of sentiment during the past half century or more.

Originally limited principally to foods and drugs, its scope has been widened so as to include numerous technical products which have no relation to diet or medicine, and it is not likely to reach high tide until practically every article used in the arts or in the daily life of the community has been provided with an appropriate standard and bears a truthful label.

The selection and determination of practicable standards of strength and purity, and the adoption of an appropriate nomenclature to correspond thereto, is therefore quite as important a matter as the prohibition of adulteration and misbranding itself, and is in fact an essential part of such prohibition, and one of the most important topics just now engaging the attention of food and dairy officials.

For the commonly used drugs and medicinal chemicals we have the United States Pharmacopœia and the National Formulary, though both of these labor under the disadvantage of having been prepared primarily as professional guides rather than as legal standards, and being afterward adopted by the Federal Food and Drugs Act, do not always perfectly fit the task somewhat suddenly imposed upon them. So also there is in course of preparation what might be considered a third list of standards of medicinal chemicals, being those determined by the Council of Pharmacy and Materia Medica of the American Medical Association.

While these three authoritative works cover their respective fields in a fairly satisfactory manner, they leave uncovered the broader field which includes the substances used in the arts and technical industries and also a large number of drugs and drug combinations which, though

they have not attained the honor of recognition by any of the foregoing authorities, are yet important articles of daily drug commerce.

For all of this large number of substances there must and will be standards adopted, and it is a matter of prime importance to the industries concerned that the source from which these standards emanate should be fully competent to deal with the subject.

If their creation is left to the federal and state departments which are charged with the enforcement of the labeling and anti-adulteration laws, they will be created piece-meal, as the exigencies of the departments require, will be as numerous as the authorities creating them, and will be brought into interstate uniformity only after a long and painful struggle. They will frequently be determined by men who, however competent in their own lines of work, will have no technical knowledge of the manufacture and use of the articles for which they undertake to set the limits of strength and purity, as was the case during the past year, where a food and dairy chemist was called upon to establish, and did establish, the standards which were subsequently enacted as a part of a paint law.

So, also, if these standards have a political origin they will almost certainly, like the oleomargarine standards, be tinctured with politics, and will almost always be composed with one prime object in view, namely, to convict the accused as easily and as speedily as possible.

Another source for the creation and promulgation of such a body of standards would be some great national association of sufficient dignity and influence to insure that its resolutions would be given respectful consideration by courts and law-making bodies.

It should be an association whose membership embraces representatives of every interest concerned with the production, distribution and use either in a commercial or scientific way of the substances with which such a system of standards must deal. It should be an association in which political influence cannot find place or support, and one which is wholly ethical in its purposes, but which follows practical rather than utopian ideals; in short, the inauguration of a system of nomenclature for products not covered by the existing recognized standards, and for the setting of the limits of strength and purity for such products, should be under the auspices of such a body as the AMERICAN PHARMACEUTICAL ASSOCIATION.

The fitness of this association to inaugurate such an undertaking, and the importance of the work itself, are so palpably evident that to enlarge upon these topics seems superfluous.

As a tentative scheme for the inauguaration of such a work, the following was offered.

Resolved, 1. There shall be a standing committee of the Council to be known as the Committee on Standards of Non-Official Drugs and Chemical Products, consisting of fifteen members elected by the council, but the members of such committee need not be members of the Council.

2. The first committee shall be constituted as follows: Two representatives from firms engaged in the manufacture of chemicals, two representatives from firms engaged in the manufacture of pharmaceuticals, two representatives in the wholesaling of drugs and chemicals, five retail druggists, and four representatives from the faculties of colleges of pharmacy.

3. The committee shall prepare from existing sources of information, a tentative list, subject to revision, correction and extension by this association of the principal drugs, chemicals and medicinal preparations not recognized by the United States Pharmacopœia, with a suitable system of nomenclature for the same, and shall adopt suitable limits of strength and purity therefor.

4. The Chairman of said committee shall be designated by the Council, and the committee shall report progress annually.

5. The committee first chosen shall serve for one year, and at the next annual meeting of the Council shall report upon a plan for the permanent organization of the committee, and also upon a plan for the permanent continuance of the work.

The resolutions were seconded by H. M. Whelpley and discussed by Messrs. Whelpley, England, Searby, Lemberger, Oldberg, Eberle and Eliel, and adopted.

A nominating committee consisting of Oscar Oldberg, Charles E. Caspari, Jr., and J. H. Beal, Chairman, at a later session of the Council presented the following nominees who were duly elected.

Manufacturing Chemists—Thomas P. Cook and Edward Mallinckrodt.

Manufacturing Pharmacists—John M. Francis and C. E. Vanderkleed.

Wholesale Druggists—George B. Kauffman and M. N. Kline.

Retail Druggists—H. P. Hynson, George M. Beringer, O. Raubenheimer, J. M. Good and Leo Eliel.

Pharmaceutical Faculties—Richard Fischer, Charles E. Caspari, W. A. Puckner and J. A. Koch.

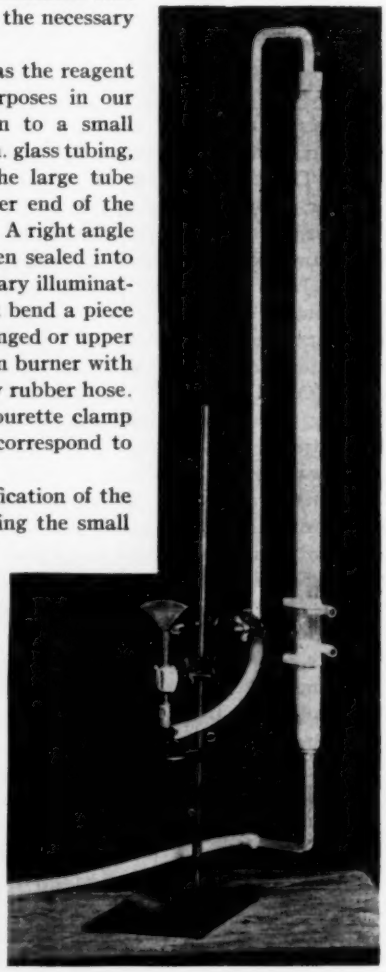
EXHIBIT "B"—MEMBERS OF THE COMMITTEE.

	1908.	1909.	1910.	1911.	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.
Beringer, Geo. M.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Caspari, Chas. E.	√	√	√																	
Cook, Thos. P.	√	√	√	√																
Fischer, Richard	√																			
Francis, John M.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√			
Eliel, Leo	√																			
Good, J. M.	√																			
Hynson, H. P.	√																			
Kauffman, Geo. B.	√	√																		
Kline, M. N.	√																			
Koch, J. A.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Mallinckrodt, Edward	√																			
Puckner, W. A.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Raubenheimer, Otto	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Vanderkleed, C. E.	√	√	√	√																
Cohn, Alfred I.		√																		
Kebler, L. F.		√	√																	
Kraemer, Henry		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√				
LaWall, Chas. H.		√	√																	
Ladish, E. A.		√																		
Rosengarten, Geo. D.		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Wilbert, M. I.		√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√
Dye, Clare A.			√																	
Gane, E. H.			√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Rusby, H. H.			√	√	√	√	√	√	√	√	√	√	√	√	√				√	√
Murray, B. L.				√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Eldred, F. R.				√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Havenhill, L. D.				√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Newcomb, E. L.				√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Hemm, Francis					√															
Wyckoff, Elmer E.					√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
Roberts, John G.						√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Farwell, O. A.										√	√	√	√	√	√	√	√	√	√	√
Schaefer, Hugo																		√	√	√
Giesey, P. M.																			√	
Lynn, E. V.																				√
Fischer, Earl																				√

A NEW SOURCE OF SODIUM LIGHT.

BY RUSSELL R. FREW.*

In teaching a laboratory class in drug analysis, where the use of the polariscope and Abbé refractometer is almost continuous, it is necessary to have an economical as well as efficient source of sodium light. After trying all the available methods of producing the D ray including the usual polariscope sodium lamps and the method of passing illuminating gas through a hydrogen generator, producing hydrogen in the presence of sodium chloride by the action of hydrochloric acid on zinc, we came to the conclusion that none will give a continuous and equally intense flame for the necessary length of time.



This apparatus using ordinary "Dutch Cleanser" as the reagent was designed by the author to serve the aforesaid purposes in our laboratory. A piece of 10-mm. glass tubing was drawn to a small capillary at one end, sealed into the end of a piece of 25-mm. glass tubing, 70 cm. in length. The point of the capillary up in the large tube should be 4–5 cm. from the place of sealing. The upper end of the 25-mm. tube should be flanged to hold a rubber stopper. A right angle bend should be made in the 10-mm. tube after it has been sealed into the large tube as shown in the illustration. To this ordinary illuminating gas is then attached by means of rubber hose. Next bend a piece of 10-mm. glass tubing into an (L) and attach it to the flanged or upper end of the 25-mm. tube with a rubber stopper. A Bunsen burner with a wing-top is then attached to the lower end of the (L) by rubber hose. A Liebig condenser clamp holds the glass tube while a burette clamp holds the burner and permits its raising or lowering to correspond to the height of the polariscope.

Should one not be handy at glass blowing this modification of the above could be successfully carried out. Instead of sealing the small tube into the large one, flange or fire polish both ends of the 25-mm. glass tube. In place of the small 10-mm. capillary tube, remove the rubber bulb from a straight medicine dropper and insert the glass barrel in a one-hole rubber stopper. Place the stopper and barrel of the medicine dropper in the lower end of the large tube and attach the rubber hose from the illuminating gas cock to the rubber bulb end of the dropper.

The amount of "Dutch Cleanser" to place in the large tube will vary with the amount of illuminating gas pressure at your disposal. We use a height of 6–7 cm. above the capillary point for our artificial gas. Should your gas pressure be low, the opening in the capillary should be large and the height of "Dutch Cleanser" decreased. If your gas pressure is very high the capillary opening should be very small and the layer of "Dutch Cleanser" increased. The ideal flame can be obtained only by trial under your own conditions.

The action is due to the gas agitating the powdered cleanser which becomes a spray and is carried over through the hot flame of the burner. "Dutch Cleanser" apparently has the necessary finely powdered sodium compounds to impart a distinct yellow color to the flame. The wing-top on the burner spreads the yellow flame over a greater area increasing greatly the intensity of the light.

In our laboratory we have a Duboscq-Pellin Polarimeter and Abbé-Spencer Refractometer which were both used by the students and myself almost continuously throughout the semester.

* Instructor in Pharmacy, The State College of Washington, Pullman, Wash.

Never once did we have to refill the above apparatus with "Dutch Cleanser" which shows that it can be run practically without cost.

JOHN WESLEY FORMULARY.

All of the readers know of John Wesley as the founder of Methodism, the missionary, the hymn-writer—it is said he traveled a quarter of a million miles, preached more than 40,000 sermons and published twenty-three collections of hymns and left a Journal of historical interest and literary value. Few, perhaps, know that John Wesley's "Primitive Physic" passed through more than thirty editions—the thirty-second was published a century ago. He also published "A Collection of Receits for the Use of the Poor," the price of which was 2 pence. He said in his commendation of the formulas: "I suppose there are very few infallible medicines; but believe most of these which will follow will fail as seldom as any, and much more seldom than the costly ones in common use." He selected those which, in his opinion, were not only cheap but safe; he also revised many of the formulas, omitted others and introduced new ones of which he said, "have been but lately discovered; and several (although they have been long in use) I had never tried before." W. Hawes, Apothecary, reviewed Wesley's larger work under the title: "An Examination of the Rev. Mr. John Wesley's Primitive Physic." As a result of this criticism Wesley prepared another edition—the 20th; it should be stated that Hawes commended a number of Wesley's instructions in the edition reviewed by him, and later revisions showed many improvements. Thousands of copies of Wesley's work were sold and added in no small way to his fame.

Bristol, England, is entitled to the distinction as the "Birthplace of America;" from its port, in 1497, John and Sebastian Cabot departed on their first voyage of discovery. Here John Wesley established the first Wesleyan Chapel, still standing in Broadmead; also, in Queen Square is the first American Consulate, opened September 1792.

Photograph by Courtesy of "Western Daily Press," Bristol

Left—John Wesley's Chapel, Broadmead. An exterior view of the first Wesleyan Chapel in the world.

Right—37 Queen Square. First American Consulate. Opened September 1792. The first American Consul was Elias Vanderhorst, a South Carolinian.

CHAIRMAN OF COMMITTEES FOR RAPID CITY MEETING.

At a recent Rapid City meeting, Local Secretary Brown appointed the following pharmacists as chairmen of various committees to aid him in carrying on the work of preparation for the pharmaceutical meetings: *Publicity*, R. L. Bronson; *Finance*, Richard Ottman; *Reception*, C. B. Baldwin; *Entertainment*, C. L. Doherty; *Women's Reception*, Mrs. Richard Ottman; *Program*, Dean E. R. Serles; *Hotels*, Charles Fallon; *Transportation*, Arthur Nielson.

EDITORIAL NOTES

Editor: E. G. EBERLE, 10 West Chase St., Baltimore, Md.

Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* CHARLES H. LAWALL, *Vice-Chairman;* E. F. KELLY, *Secretary;* H. V. ARNY, A. G. DUMEZ, H. A. B. DUNNING, H. C. CHRISTENSEN, J. A. KOCH, J. H. BEAL, W. B. DAY, T. J. BRADLEY. *Ex-Officio Members:* D. F. JONES, *President;* A. W. PAULEY, W. H. ZEIGLER, *Vice-Presidents;* C. W. HOLTON, *Treasurer;* E. G. EBERLE, *Editor of the Journal;* A. G. DUMEZ, *Editor of the Year Book;* AMBROSE HUNSBERGER, *Chairman of the House of Delegates.*

Collaborators: The Members of the Council; E. FULLERTON COOK, *Chairman,* U. S. P. Revision Committee; W. L. SCOVILLE, *Chairman,* N. F. Revision Committee; the Chairmen of the Sections, A. PH. A.; J. C. MUNCH, A. L. I. WINNE, P. H. DIRSTINE, R. B. ROTHROCK, LYMAN F. KEBLER; A. G. DUMEZ, *President,* A. A. C. P.; CHARLES B. JORDAN, *Chairman,* Executive Committee, A. A. C. P.; H. M. LEROU, *President,* N. A. B. P.; HENRY C. CHRISTENSEN, *Secretary,* N. A. B. P.

THE ELEVENTH DECENNIAL PHARMACOPŒIAL CONVENTION.

The Board of Trustees of the U. S. Pharmacopœial Convention met in Washington during the first week of May to dispose of routine matters of business and to provide for the Pharmacopœial Convention to meet in Washington, May 13, 1930. Among other matters of business it was arranged to include representatives in the Convention from the Insular Possessions of the medical and pharmacy schools and medical and pharmacy organizations. The Insular Possessions included are Hawaii, the Philippine Islands and Porto Rico.

The Board of Trustees for the next convention is composed of the following members: *Chairman,* James H. Beal, Florida; Samuel C. Henry, Illinois; Dr. Solomon Solis Cohen, Pennsylvania; Dr. George H. Simmons, Illinois; Dr. Reed Hunt, Massachusetts; E. Fullerton Cook, Pennsylvania; Frederick J. Wulling, Minnesota. The Secretary of the Board is William B. Day, of Chicago, and the Treasurer of the Convention is Samuel L. Hilton, of Washington. Dr. Lyman F. Kebler, of Washington, is the Secretary-Elect of the Convention.

THE PHILIPPINE PHARMACEUTICAL JOURNAL.

We have before us No. 3, Volume I, of the *Journal of the Philippine Pharmaceutical Association.* The publication evidences the interest in pharmacy in the Philippine Islands. The editorials relate to manufacturing pharmacy in the Philippines and encouragement of professional pharmacy.

It is interesting to note that General A. Luna was a pharmacist. His birthday was celebrated by pharmacists and we quote from the sketch of the November number of the *Journal.* After preliminary education he pursued pharmaceutical studies at the University of St. Thomas. In 1885, he was awarded first prize on an essay entitled, "Two Important Chemical Compounds." After two years residence at his *Alma Mater* he went to Europe and continued his pharmaceutical studies at the University of Madrid. After graduation, he continued post-graduate pharmaceutical studies. He then went to Belgium and continued his studies in a school of chemical engineering at Ghent. Then he came to Paris where he worked as assistant to Dr. Laffon. In recognition of his attainments in bacteriology the Spanish government commissioned him, in May 1894, to undertake the bacteriological study of contagious diseases in the Philippines and at the end of the next year he was appointed chemist of the municipal laboratory of the City of Manila.

The sketch closes with the following paragraph:

"In commemorating the sixtieth anniversary of the birthday of General Luna, it is hoped that the members of the pharmaceutical profession in the Philippines shall not fail to give the exemplary life of Antonio Luna as a General and as a Pharmacist, its true significance."

An article in the same issue is on "A Compound, $C_{15}H_{24}O$, from the Mother Liquid of Caryophylline Nitrosite." This investigation was carried on at the University of Wisconsin by Dr. Patrocinio Valenzuela of the School of Pharmacy of the University of Philippines.

Another article relates to a study of the pharmacology of Philippine medicinal plants, by Dr. Conrado Potenciano.

The abstracts of the *Journal* are well selected. In the same issue there is printed a bill presented to the Philippine Legislature amending the pharmacy law, which was approved by the Senate, but failed to pass the House of Representatives.

A Department of the *Journal* relates to pharmaceutical science in the Philippines and elsewhere and we are glad to note that the AMERICAN PHARMACEUTICAL ASSOCIATION is considered in these reports and a reference is made to Dr. A. G. DuMez, President of the American Association of Colleges of Pharmacy, who was the first director of the School of Pharmacy of the University of Philippines.

The *Journal* is coöperating with the Philippine Board of Pharmacy and reports the drug stores that have been opened under the sanction of the Board of Pharmacy.

The issue also contains the Constitution and By-Laws of the Philippine Pharmaceutical Association. A list of the officers of the Association appears in the roster of this issue.

Among the news items it is stated that Dr. Leon Ma. Guerrero, the oldest pharmacist and well-known botanist in the Philippines, was honored at the second annual banquet of the Alumni Association of the University of St. Thomas. Dr. Guerrero is the oldest living graduate of the School of Pharmacy.

Another item of news states that in the laboratory of Hizon and Rodriquez an efficient treatment for leprosy has been perfected and according to the statement twenty-five leper patients have been cured by this treatment. It is said not to contain oil of chaulmoogra.

Another item reports the death of the brother of Director M. V. del Rosario, Dr. Salvador V. del Rosario, former member of the faculty of the School of Pharmacy, on October 28th, at the age of 64 years.

At a scientific social meeting of the Manila College of Pharmacy the Dean, Antonio Llamas, presented a paper in which he compared the drug stores in the Philippines with those of the U. S.

NEW AND NONOFFICIAL REMEDIES.

The following additional articles have been accepted as conforming to the Rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the Rules on which the Council bases its action will be sent on application.

W. A. PUCKNER, *Secretary*.

SALYRGAN.—Mersalyl. Sodium {*o*-[hydroxymercuric-methoxy-propylcarbamyl] phenoxy}-acetate.-$NaOOC.CH_2.O.C_6H_4.CONH.C_3H_5(O.CH_3)(HgOH)$. Salyrgan is a complex synthetic mercurial, prepared by the action of mercury acetate and methyl alcohol on salicylallylamido-*o*-acetic acid and subsequent conversion to the sodium salt. Salyrgan when dried to constant weight contains 39.6 per cent of mercury in nonionizable form.

Actions and Uses.—Salyrgan has been demonstrated to exert a destructive action on the spirochæte of syphilis in rabbits, but is used chiefly as a diuretic. It induces diuresis only provided sufficient renal tissue is still intact and is therefore contraindicated in acute diseases of the kidney as well as in advanced nephritis. It is effective in ascites and edema of cardiac and cardiorenal origin; also in ascites resulting from cirrhosis of the liver. It has been tried in hydrothorax, pericardial effusion, and in the ascites of tuberculosis peritonitis, but without uniform results.

Dosage.—Salyrgan is supplied only in the form of a 10 per cent solution. As diuretic, an initial dose, intramuscularly or intravenously, of 0.5 cc. of the solution to test tolerance, increased to 1 cc. or to a maximum of 2 cc. if required; injections are made at intervals of from three to five days.

Manufactured by H. A. Metz Laboratories, Inc., New York. No U. S. patent. U. S. trademark 188,515.

Ampules Salyrgan Solution, 1 cc.—Each ampule contains 1 cc. of a 10 per cent solution of salyrgan.

Ampules Salyrgan Solution, 2 cc.—Each ampule contains 2 cc. of a 10 per cent solution of salyrgan.

Salyrgan occurs as a white, crystalline, odorless powder with a bitter taste; readily soluble in ethyl alcohol, about 1 in 3, methyl alcohol, about 1 in 2 and water, about 1 in 1, and insoluble in ether. An aqueous solution is alkaline to litmus paper.

Dissolve 0.5 Gm. in 5 cc. of water, add 5 cc. of formic acid (90 per cent), boil the mixture under a reflux condenser for fifteen munites: the precipitate formed dissolves, leaving a gray residue containing fine globules of metallic mercury. Filter the mixture through paper while hot; allow the filtrate to cool, collect the resultant salicylallylamido-*o*-acetic acid crystals on a filter paper, wash and dry over sulphuric acid in a partially exhausted desiccator: it melts at 120–121 C. Dissolve about 1 Gm. in 10 cc. of water, add 10 cc. of a solution of hydrochloric acid (1 part hydrochloric acid and 1 part hydrochloric acid and 1 part water), connect to a condenser, distill off about three-fourths the volume: the distillate responds to tests for methyl alcohol. Dissolve 0.5 Gm. in 5 cc. of water, add 0.5 cc. of diluted acetic acid and 0.3 of sodium sulphide solution: no coloration results (*heavy metals—especially mercuric ions*). Dissolve 0.1 Gm. in 5 cc. of water, add 1 cc. of nitric acid, filter through paper and divide the filtrate into two portions; to one portion add 1 cc. of silver nitrate solution: no opalescence results (*chlorides*); to the other portion add 1 cc. of barium nitrate solution: no turbidity results (*sulphates*). Dissolve 0.5 Gm. in 10 cc. of water, add 1-cc. diluted sulphuric acid, filter through paper and divide the filtrate into two portions;

to one portion add 0.1 cc. of tenth-normal potassium permanganate solution: no immediate decolorization results (*salicylallylamido acetic acid*); to the remaining portion add 0.1 cc. of diluted ferric chloride solution; no violet color develops (*salicyllylamide*). When tested for arsenic according to the U. S. Pharmacopœia X, the product meets the requirements for arsenic (p. 428, Arsenic Test).

Dry about 1 Gm., accurately weighed to constant weight over sulphuric acid in a partially exhausted desiccator: the loss in weight does not exceed 5.0 per cent. Transfer about 0.5 Gm., accurately weighed, to a 500-cc. Kjeldahl flask, and determine the nitrogen content according to the official method described in Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists, Second Edition, p. 8. The percentage of nitrogen corresponds to not less than 2.55 per cent, nor more than 3.0 per cent when calculated to the dried substance. Weigh accurately about 0.5 Gm. in a tared platinum dish, add 10 cc. of sulphuric acid, gently heat while fumes of sulphur trioxide are evolved, repeat, using two portions of 2 cc. of sulphuric acid, respectively, ignite, cool and weigh as sodium sulphate. The percentage of sodium corresponds to not less than 4.3 per cent, nor more than 4.9 per cent, when calculated to the dried substance. Transfer about 0.5 Gm., accurately weighed, to an Erlenmeyer flask; add 100 cc. of water and agitate until the powder has dissolved; add 15-cc. hydrochloric acid, connect to a reflux condenser and boil for three hours. Add 1.75 cc. of hot water, and pass in hydrogen sulphide for fifteen minutes. (It is important that the temperature of the solution should be about 70 C. in order to keep in solution slightly soluble organic compounds formed during hydrolysis.) Filter while warm, through a Gooch crucible, wash with distilled water and finally three parts of cold alcohol and then one portion of carbon disulphide. Close the rubber tubing leading from the suction flask to the suction pump with a pinch clamp; add sufficient carbon disulphide to cover the precipitate, cover the crucible with a watch glass and allow to stand one-half hour. Then release the pinch clamp, drain off the solution and wash with several portions of carbon disulphide. Dry in an oven at 100 C., weigh the mercury sulphide and calculate to mercury. The percentage of mercury corresponds to not less than 38.0 per cent, nor more than 41.0 per cent, when calculated to the dried substance.

BROMIPIN 33 PER CENT.—Brominized Sesame Oil, 33 Per Cent-Merck.—A bromine addition product of sesame oil, containing from 31 to 35 per cent of bromine in organic combination.

Actions and Uses.—Bromipin, 33 per cent, acts like the inorganic bromides. The combination is not broken up in the stomach; but a portion of the bromine is split off as soon as the compound enters the intestine; the remaining compound is readily absorbed and, as in the case of other fats, is largely deposited in the tissues where it is slowly split up. It is said to be more lasting in its action than the bromides. Bromipin, 33 per cent, is used as a contrast medium for roentgen diagnosis of the tracheobronchial tree. It is stated to be applicable in cases of mild or medium tuberculosis in which the use of an iodized oil is contraindicated.

Dosage.—For therapeutic use, 1.3 cc. (20 minims) which may be increased in cases of epilepsy to from 3 to 10 cc. (40 to 160 minims); for use as a contrast medium in bronchography, the quantity required varies from about 10 cc. to about 30 cc. for each lung. Before injecting into the bronchial tree the oil should be warmed to 37 to 40 C. to reduce its viscosity.

Manufactured by Merck & Co., Inc., Rahway, N. J., under license of the Federal Trade commission. U. S. patent 774,224 (Nov. 8, 1904; expired). U. S. trademark 32,002.

Bromipin, 33 per cent, is prepared by action of bromine chloride to produce the required brominization.

Bromipin 33 per cent is a yellow oily liquid, having an oleaginous taste.

To 1 cc. of bromipin 33 per cent add 1 cc. of chloroform and a few drops of phenolphthalein solution: the addition of 0.3 cc. of half-normal sodium hydroxide produces a red color (*limit of acidity*).

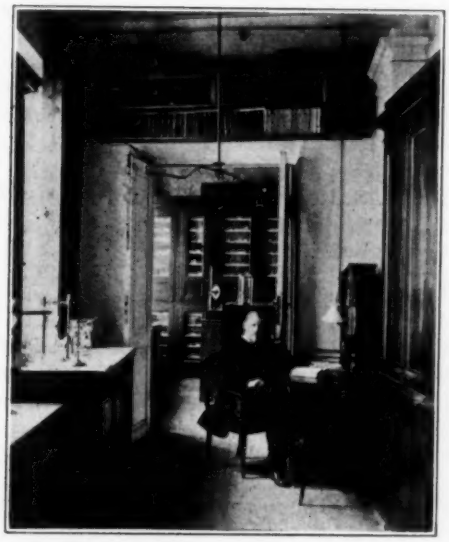
Saponify about 1 Gm. of bromipin 33 per cent, accurately weighed, by boiling with 25 cc. of alcohol and 5 Gm. of potassium hydroxide in a porcelain dish. Evaporate to dryness on a water-bath and incinerate the residue over a gentle flame. Dissolve in water to make exactly 200 cc. and filter. Acidulate 50 cc. of the filtrate in a separator with diluted sulphuric acid; add 20 cc. of carbon tetrachloride and 5 cc. of freshly prepared chlorine water. Shake thoroughly and allow to separate. Repeat this until further additions of chlorine water do not cause the aqueous layer to become yellow. Draw off the carbon tetrachloride solution. Add 10 cc. of carbon tetrachloride, agitate and draw off the solution, uniting it with the first carbon tetrachloride solution. Repeat the extraction with a further portion of 5 cc. of carbon tetrachloride. Pass the carbon tetrachloride solution through a dry filter into a flask and add potassium iodide solution. Shake thoroughly and titrate the free iodine with tenth-normal sodium thiosulphate: the amount of bromine found is not less than 31 per cent nor more than 35 per cent.

From *Jour. A. M. A.*, Dec. 22, 1928.

PERSONAL AND NEWS ITEMS.

Our fellow member, in the City of Mexico, Dr. G. G. Colin, has recently sent in two applications for membership in the AMERICAN PHARMACEUTICAL ASSOCIATION. Prof. Juan Manuel Noriega, one of our new members, is one of the best known pharmacists of Mexico; is a former president of the Mexican Pharmaceutical Association and of the Mexican Chemical Society; until recently he was director of the Faculty of Chemical Sciences of the National University of Mexico; he is a member of the National Academy of Medicine. Professor Noriega is the author of a well and favorably known text on "History of Drugs" (now out of print) and also of a textbook on "Practical Pharmacy;" his contributions to pharmaceutical literature on native botanical drugs are numerous. The other new associate is a young chemist of Mexico, Manuel Dondé, member of the Mexican Chemical Society and Assistant Editor of the *Revista Quimica* of the Society.

Another foreign member recently added to the A. PH. A. is from Esthonia—Prof. Nicolai Veiderpass of the University of Tartu, of which the late Dr. G. Dragendorff, an honorary member of the ASSOCIATION, was for many years head and member of the faculty. This, of course, evidences a universal interest in pharmacy, but there is satisfaction in that the relations have come through the medium of the JOURNAL.



Prof. Dragendorff in his study.

Wilbur L. Scoville is the Remington Medalist for 1929. As is generally known, the winner of the prize is *Chairman* of the Revision Committee, National Formulary VI, also *First Vice-Chairman* of the General Committee of Revision U. S. P. X. In 1924, the Philadelphia College of Pharmacy and Science conferred on him the Ph.M. degree; in 1927, the Massachusetts College of Pharmacy honored him with the degree of Doctor of Pharmacy, and the Master of Science degree was conferred on him, in 1928, by the University of Michigan. The Remington Honor Medal was founded by the New York Branch A. PH. A. The date of the formal award has just been announced and further reference to the worthy bestowal and the honored pharmacist will be reserved for the report of the New York Branch A. PH. A. meeting when the award is made on June 5th.

Dean Julius A. Koch, of the Pittsburgh College of Pharmacy, attended the dinner given in honor of the 25th anniversary of the faculty membership in the St. Louis College of Pharmacy of Dean Charles E. Caspari. He conveyed greetings of the Pittsburgh College of Pharmacy, of the AMERICAN PHARMACEUTICAL ASSOCIATION, and of the American Association of Colleges of Pharmacy.

Dr. Oliver Kamm, member of the A. PH. A., has been elected president of the Michigan Academy of Science, Arts and Letters. Recently he was awarded the prize of the American Association for the Advancement of Science. Dr. Kamm was formerly on the teaching staff of the University of Michigan, and of the University of Illinois; he is chief of the chemical research division of Parke, Davis & Co.

Charles F. Nixon, member of the A. PH. A. since 1900, celebrated the 50th anniversary of his entrance into business at Leominster, Mass. Mr. Nixon is well and favorably known, not only as pharmacist, but as college professor and board member; he is a life member of the Massachusetts College of Pharmacy, a former president of the Massachusetts Pharmaceutical Association, was for a number of years president of the Leominster Hospital Association, is city bacteriologist, and is connected with other local activities and organizations.

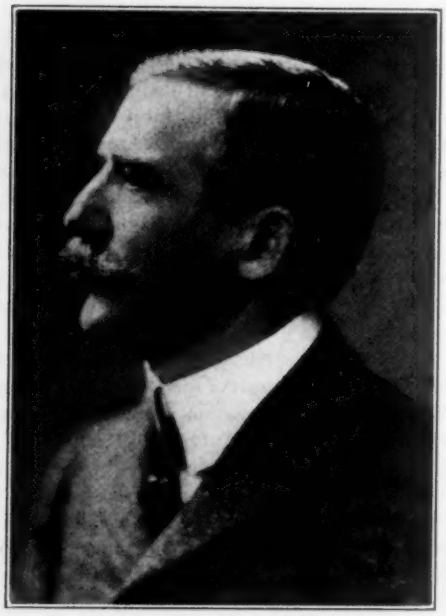
First Vice-President A. W. Pauley attended the golden anniversary meeting of Kansas Pharmaceutical Association, as delegate of the AMERICAN PHARMACEUTICAL ASSOCIATION, which he reports as having been successful in every way.

Secretary Roy C. Reese, of Kansas Pharmaceutical Association, in reporting on the golden anniversary meeting, states that the membership is now 800, out of a total of 1100 drug stores. There is a growing enthusiasm among the members and they are pleased with their success in placing a new pharmacy law, with graduation prerequisite, on the statute books, commemorating the "golden anniversary." Secretary Reese hopes to attend the meeting in Rapid City.

Dr. Henry S. Wellcome, member of the A. PH. A. for more than 50 years, gave a reception March 1st, in London, to meet the Lord Chancellor and Lady, and also the members of the King's Fund. Sir John Rose Bradford, president of the Royal College of Physicians, explained the methods which are to be adopted by the King Edward's Hospital Fund Commissions for using, for the benefit of London voluntary hospitals, the radium purchased with Sir Otto Beit's gift of £ 50,000. The latter was prevented from being in attendance on account of illness.

Dr. Wellcome responding to the vote of thanks for his hospitality as host said that this gift was one of the finest benefactions to the human race. Referring to the museum in which the reception was held, he said it was valuable for all students and research workers; indicating as it did the evolution of the medical sciences, he said that it was only in its infancy. The premises in which the museum is housed are only temporary and he hoped ultimately to

rehouse the collection of which only one-tenth was at present displayed.



HENRY S. WELLCOME.

At the May meeting (May 2nd) of the New York Deutscher Apotheker Verein **Prof. Otto Raubenheimer** of Brooklyn delivered an interesting lecture on "Celebrated German Apothecary Families." He dwelt especially on the *Gmelin* family in Tübingen and the *Rose* family in Berlin, both of which for several generations supplied not only noted pharmacists but also celebrated chemists, physicians, botanists and naturalists. The speaker illustrated his lecture with photos and books of descendants of both families and expects to deliver this lecture in English, enlarged with other families of German apothecaries, before the Section on Historical Pharmacy at the A. PH. A. meeting in Rapid City, South Dakota, in August.

W. Bruce Philip, instructor in Commercial Pharmacy and the Laws of Pharmacy at the California College of Pharmacy will be granted an honorary degree of Master in Pharmacy by the Philadelphia College of Pharmacy and Science in June.

E. F. Kelly has been reappointed by Governor Ritchie to membership in the Maryland State Department of Health.

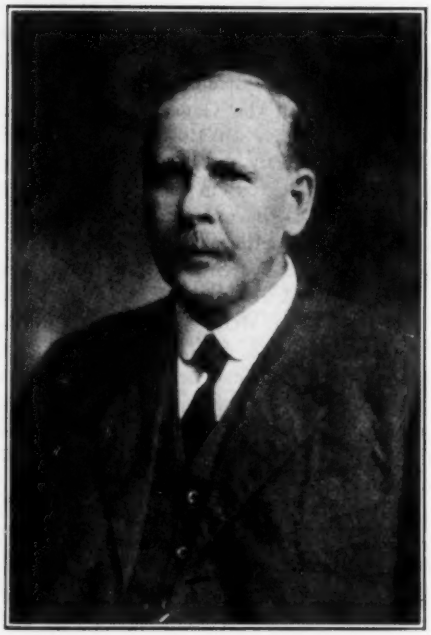
James O. Clarke has been promoted to the position of chief of the Central District of the Food, Drug and Insecticide Administration (stationed at Chicago) to fill a vacancy created by the resignation of E. H. Goodnow, according to an announcement by W. G. Campbell, Director of Regulatory Work of the United States Department of Agriculture.

DR. H. H. RUSBY AWARDED HANBURY MEDAL FOR 1928.

Just as we are closing the forms for the JOURNAL we have the information in a London dispatch that Dr. H. H. Rusby, Dean of Columbia University College of Pharmacy, has been awarded the Hanbury gold medal for 1928 for high excellence in the promotion of original research in the natural history and chemistry of drugs.

The Adjudicating Committee consisted of Sir Sydney Harmer, Prof. J. F. Thorpe, H. Skinner, R. R. Bennett and A. R. Melhuish.

Only two other American pharmacists have been awarded the Hanbury medal—Prof. John M. Maisch and Dr. Frederick B. Power. Dr. Rusby is a former President of the AMERICAN PHARMACEUTICAL ASSOCIATION having held the office in 1910–1911.



DR. H. H. RUSBY.

The dispatch indicates that Dr. Rusby will go to England in October for the formal award.

OBITUARY.

WILLIAM LARREMORE DUBOIS.

William Larremore DuBois, Honorary President of the AMERICAN PHARMACEUTICAL ASSOCIATION for 1923–1924, celebrated his 90th birthday last year at the meeting of the ASSOCIATION in Portland. During the A. PH. A. meetings Mr. DuBois was accompanied by his daughter and we are taking the liberty of printing a picture of him and Miss Charlotte which was taken at the Des Moines meeting.

W. L. DUBOIS AND DAUGHTER.

References to the activities of Mr. DuBois will be found in the JOURNAL for 1917 (March number, page 273) and also in the January issue of this year, page 52. These articles were prepared by the veteran in giving a history of his store which was founded in 1795. Mr. DuBois engaged in the drug business with Schieffelin & Co., in New York City, and remained with that firm until 1863 when he formed a partnership with the late Benjamin Wey, of Catskill. After the retirement of the latter Mr. DuBois became the sole owner and conducted the pharmacy until the time of his death; his son, J. Mortimer DuBois, has been associated with him in the business for a number of years.

Mr. DuBois was born in New York City, August 25, 1838, and for 65 years he had been a resident of Catskill, N. Y. He was a veteran member of New York State Pharmaceutical Association and joined the AMERICAN PHARMACEUTICAL ASSOCIATION in 1880. In 1916, he was chairman of the Section on Historical Pharmacy.

Our veteran lived in the present and looked forward; he did not permit his memories to obstruct the things of to-day and he kept constantly informed on current events. Quite naturally he frequently dwelt on the things of the past, but he could see advantages in present-day progress. He was public spirited and interested in the affairs of his home town and alive to its welfare. For many years he was vestryman and warden of St. Luke's Episcopal Church.

The deceased had been in failing health for about a year but was able to come to the store until about two or three months ago. He died, May 3rd, at his home and is survived by his son, J. Mortimer DuBois, of Catskill and three daughters—Mrs. Frederick W. Goodrich, of Catskill; Mrs. James Hutchens, of Pelham, N. Y., and Miss Charlotte, of Garden City.

The local paper closes a sketch in which we join: "He leaves behind a rich heritage of loving and pleasant memories and a record of life well spent."

JOHN HENRY FLINT.

Prof. J. H. Flint died April 2nd at the dinner table; death came suddenly and unexpectedly following a heart attack. The deceased graduated from the Philadelphia College of Pharmacy in 1873 and received the degrees of Phar.D. and Ph.M. from the College of Physicians and Surgeons. He was a member of the faculty of the latter for many years, up to the time of his demise.

Soon after graduation in pharmacy he opened a pharmacy in Marysville, Calif., and, in 1891, became a member of the first California Board of Pharmacy. He earned a well-deserved reputation as chemist, toxicologist and bacteriologist and served the City of San Francisco and the State of California in these capacities.

He was beloved by his students and as

member of the American Registered Pharmacists, in which body he had held all the important offices; during later years he was a member of the National Grand Board of Directors. He was an active association worker, joining the AMERICAN PHARMACEUTICAL ASSOCIATION in 1900.

MICHAEL UHORCHAK.

Michael Uhorchak, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, died at his home, in Jersey City, December 31, 1928, aged 42 years. He was born in Ukrania and came to the United States in 1906. While working in various capacities to earn a living, he attended Eron Preparatory School. For a time he had employment in the Raubenheimer Pharmacy and in 1912 engaged with C. J. McCloskey in Jersey City. He graduated from the New Jersey College of Pharmacy in 1917, and two years later he purchased Mr. McCloskey's branch store.

Mr. Uhorchak took a deep interest in natives of his own country; one of his last efforts was to raise funds for a Ukranian Orphanage; he was president of the Ukranian Building and Loan Association. The deceased is survived by his widow and three children; the older son is a student in New Jersey College of Pharmacy; the two younger children are attending high school.

JAMES H. JONES.

James H. Jones, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1915, died at his home in Fordham, N. Y., December 8, 1928, aged 72 years. He was born at Raritan, N. J., where he received his education.

Mr. Jones engaged in business on his own account at Jersey City in 1880; in 1887 he purchased a store in Fordham, and disposed of the business in 1926, when he retired. Mr. Jones was a graduate of New York College of Pharmacy; he stressed the professional side of the business and was known as a leading pharmacist in his community.

LEOPOLD JOSEPH SCHLESINGER.

Leopold Joseph Schlesinger—member of the AMERICAN PHARMACEUTICAL ASSOCIATION, charter member and former president of New York State Pharmaceutical Association—died at his home in Yonkers, N. Y., April 11th, aged 73 years.

Mr. Schlesinger came to this country from Germany as a young man. He engaged with F. M. Wills, of Charlottesville, Va., until 1878, when he matriculated at the College of Pharmacy of the City of New York and was graduated in the class of 1880. In 1882, he opened a pharmacy on his own account and continued the business until his demise.

Mr. Schlesinger took an active part in civic and fraternal affairs and was highly regarded as citizen, professional and business man. He was a civil service commissioner, park commissioner, a bank trustee and for many years treasurer of the First Unitarian Church of Yonkers. Two children survive the deceased.

BRUNO A. C. HOELZER.

B. A. C. Hoelzer died at St. Mary's Hospital in Chicago, April 12th. The deceased was on his way home when struck by a speeding automobile, the driver of which rushed away without stopping.

Mr. Hoelzer was a graduate of the Chicago College of Pharmacy, class of 1893. He had taken an active part in pharmaceutical organization in Chicago and was a prominent member of the Chicago Retail Druggists' Association. He served the C. R. D. A. as president five or six years ago; he held membership in the Chicago Veteran Druggists' Association, of which organization he was a former president. He had for many years conducted a prosperous pharmacy at 2546 Milwaukee Ave., Chicago, and was well-known as a prescription pharmacist in his section of the city. He leaves a wife and two children.

Dr. Arthur S. Loevenhart, professor of Pharmacology and Toxicology at Wisconsin University since 1908, died at Johns Hopkins Hospital, April 19th, where he had been a patient for two weeks. He was formerly a member of the Johns Hopkins University faculty, leaving in 1908 to join the Wisconsin faculty. Dr. Loevenhart was an occasional contributor to the JOURNAL A. PH. A.

The deceased was born in Lexington, Ky., in 1878. He received his medical degree from Johns Hopkins in 1903 and joined its faculty that autumn. In the last year of the World War he was chief of the pharmacological section of the research division of the Chemical Warfare Service.

Dr. Frederick R. Green, secretary of the American Medical Association, and later, secretary and active executive officer of the Council on Health and Public Instruction, died April 27th at his home in Chicago.

SOCIETIES AND COLLEGES.

AMERICAN DRUG MANUFACTURERS AT ASHEVILLE, N. C.

In his annual address as president of the American Drug Manufacturers' Association, Charles G. Merrell, reviewed with commendation the work of Secretary Carson P. Frailey, and the various committees, and spoke appreciatively of the relations with various government departments, particularly in the study of labels and tolerances of drug products. He viewed with favor the growth of appreciation among manufacturers of the necessity for the improvement in distribution. He commented briefly on tax and tariff problems and expressed satisfaction as to business conditions. He looked for keener competition, and suggested the necessity of revising some selling methods and stressed the importance of the recognition of common interests of manufacturers, wholesalers and retailers.

Quoting from a report of the Oil, Paint and Drug Reporter, Secretary Carson P. Frailey commented on the growing recognition among members of the benefits of the Association. He said that satisfactory government cooperation continued with the succession of J. J. Durrett to the office of chief of the drug control division, and suggested that manufacturers in selecting new trade names, submit items to the Division for approval. Progress was indicated, he said, by the government policy of giving advance information relative to studies and attitude in connection with the labeling of various classes of pharmaceutical preparations. Mr. Frailey said that he believed the administration of the prohibition law should remain in the Department of the Treasury and that the services of J. M. Doran should be retained because of his particular fitness.

The pharmaceutical section urged the cooperation of all manufacturers in the study of vitamine tests for cod-liver oil and in seeking satisfactory tests for hydrogen in concentration of liquid preparations. This contact committee will study new phases of tablet disintegration and drug labeling.

The following were chosen as officers for the ensuing year: *President*, S. B. Pennick, New York; *First-Vice President*, A. R. L. Dohme, Baltimore; *Second Vice-President*, N. Noyes; *Third Vice-President*, Dr. John Anderson, New Brunswick, N. J.; *Treasurer*, Franklin Black, New York City. Carson P. Frailey of Washington, D. C., was reëlected *Secretary* and made *Executive Vice-President*, a new office.

AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION.

The American Pharmaceutical Manufacturers' Association will hold their annual meeting in the Chamberlin-Vanderbilt Hotel at Old Point Comfort, Va., June 3rd–6th. The Chairmen of the various Sections are as follows:

Attendance, Bern B. Grubb; *Business Policy*, J. H. Foy; *Contact*, C. E. Vanderkleed, Robert McNeil; *National Drug Trade Conference*, Harry Noonan; *Distribution Problems*, F. A. Mallett; *Legislative*, C. D. Smith; *Annual Meeting*, H. B. Johnson; *Membership*, Dr C. H. Searle; *Memorial*, B. L. Maltbie; *Prior Rights Board*, R. R. Patch; *Publicity*, F. A. Lawson; *Research Awards*, Dr. A. S. Burdick; *Sales Problems*, Dr. H. Sheridan Baketel; *Standardization and Simplification*, R. M. Cain; *Standardization of Glass Containers*, C. C. Doll; *Trade Names*, R. R. Patch.

PROPRIETARY ASSOCIATION.

T. W. Delahanty, assistant chief of the Chemical Division, Department of Commerce; Dr. E. J. Durrett, chief of drug control, Department of Agriculture, and E. L. Greene, general manager of the National Better Business Bureau, were speakers at the annual meeting of the Proprietary Association in the Hotel Commodore, New York, May 7th and 8th.

The Association went on record in favor of a Pharmacy Corps in the Medical Department of the U. S. Army.

THE AMERICAN MANUFACTURERS OF TOILET ARTICLES ADOPT RESOLUTIONS OPPOSING PROHIBITION SHIFT.

Resolutions were adopted at the recent meeting of the American Manufacturers of Toilet Articles in opposition to moving the administration of the Prohibition Law to the Department of Justice. The Association is of the opinion that the logical handling of the industrial aspect of alcohol belongs in the Treasury or possibly in the Department of Commerce but certainly not in the Department of Justice. Another reason assigned for opposing the transfer is the desirability of coördinating the Customs, Coast Guard and the tax division of the Internal Revenue Bureau with the permissive department of prohibition.

MAY AND JUNE STATE ASSOCIATION MEETINGS.

MAY MEETINGS.

California.—Eureka, May 27–29.
Louisiana.—Monroe, May 14–15.
New Mexico.—Albuquerque, May 20–21.
Oklahoma.—Oklahoma City, May 14–16.
West Virginia.—Morgantown, May 22–23.

JUNE MEETINGS.

Alabama.—Huntsville, June 11–13.
Arkansas.—Little Rock, June 11–13.
Colorado.—Manitou, June 18, 19, 20.
Connecticut.—Hotel Stratfield, Bridgeport, June 26–27.
Florida.—St. Petersburg, June 19–20.
Idaho.—Lewiston, June 25–26.
Illinois.—Rockford, *Golden Anniversary Meeting*, June 25–27.
Indiana.—Lake Wawasee, June 18–20.
Kentucky.—Crab Orchard Springs, June 18–20.
Maine.—Rangeley Lakes, June 25–27.
Maryland.—Ocean City, June 25–28.
Massachusetts.—Swampscott, June 11–13.
Mississippi.—Gulfport, June 11–12.
Missouri.—Columbia, June 18–20.
Nebraska.—Lincoln, June 11–13.
New Hampshire.—Soo-Nipi Park Lodge, Lake Sunapee, June 27–28.
New Jersey.—Asbury Park, June 18–21.
New York.—Saratoga Springs, *Golden Anniversary Meeting*, June 18–20.
North Carolina.—Asheville, *Golden Anniversary Meeting*, June 18–20.
Pennsylvania.—Bedford Springs, June 18–20.
South Carolina.—Columbia, June 26–27.
South Dakota.—Corn Palace, Mitchell, June 18–20.
Texas.—Fort Worth, *Golden Anniversary Meeting*, June 18, 19, 20, 21.
Utah.—Ogden, June 20–21.
Vermont.—Lake Champlain Club, Malletts Bay, June 17–18.
Washington.—Hotel Olympic, Seattle, June 19–21.
Wisconsin.—Green Lake, June 25–27.
Wyoming.—Thermopolis, June 25–27.

GEORGIA PHARMACEUTICAL ASSOCIATION.

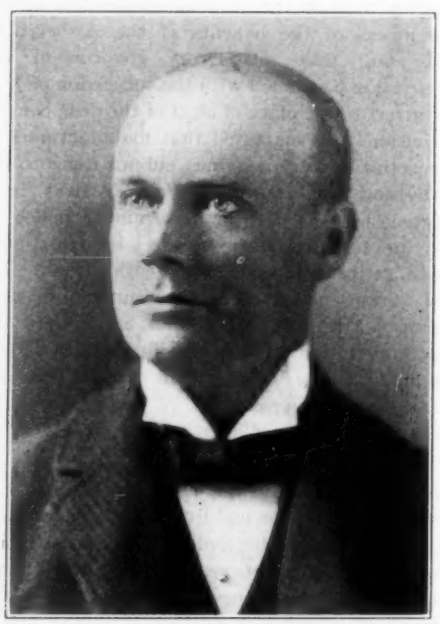
Secretary Robert C. Wilson advises that the recent meeting of the Georgia Pharmaceutical Association was a success. The meeting of the first two days was held at Valdosta and on the 19th the members went to Thomasville in a body, where the last day's session was held and the members also attended the annual rose show.

A resolution was passed authorizing the Legislative Committee to work with the Board of Pharmacy in seeking an amendment to the present pharmacy law which is to include the prerequisite of graduation requirement. Resolutions were also adopted endorsing the Pharmacy Corps Bill and requesting the Senators and Congressmen to support it.

The officers elected for the ensuing year are as follows: *President*, Walter D. Jones, Savannah; *First Vice-President*, Thomas C. Marshall, Atlanta; *Second Vice-President*, Claud Rountree, Thomasville; *Third Vice-President*, J. L. Hawk, Atlanta; *Secretary-Treasurer* to be elected by Board of Directors.

KANSAS PHARMACEUTICAL ASSOCIATION.

Vice-President Alfred W. Pauley, represented the AMERICAN PHARMACEUTICAL ASSOCIATION at the Golden Jubilee meeting of



F. E. Holliday, N. W. D. A.—One of Kansas' former presidents, when he was President.

Kansas Pharmaceutical Association. President Murray Q. Williams of Missouri Pharmaceutical Association was also in attendance. Many congratulatory telegrams were received

from other state associations. The Pharmacy Corps Bill was endorsed.

The past-presidents were presented with gold badges in recognition of their past services to the Association: Matt Noll, Atchinson; S. C. Fritsche, Kansas City; John T. Moore, Lawrence; D. Von Riesen, Marysville; A. E. Topping, Overbrook; Harry Dick, Lawrence; Walter Bangs, Emporia; J. W. Giesburg, Kansas City; W. E. Sheriff, Ellsworth; N. G. Edelblute, Topeka; C. H. Andrews, Wichita; Walter Varnum, Lawrence; Frank E. Holliday, New York City; W. W. Naylor, California; L. Ardery, California; Ellis W. Cochran, Wichita; Frank R. Milne, Pratt; and F. E. Malott, Abilene.

Former President Matt Noll presented a historical paper on "Fifty Years of Pharmacy in Kansas" and also exhibited his collection of convention badges.

The following officers were elected for the ensuing year; *President*, Charles M. McCaughan, Eldorado; *First Vice-President*, Clarence Redmond, Topeka; *Second Vice-President*, Joe DeMain, Macksville; *Secretary*, Roy C. Reese, Topeka; *Treasurer*, N. G. Edelblute, Topeka; *Librarian*, L. D. Havenhill, Lawrence.

LOUISIANA PHARMACEUTICAL ASSOCIATION.

Louisiana State Pharmaceutical Association convened in Monroe, May 14th–15th. Adam Wirth brought greetings of the AMERICAN PHARMACEUTICAL ASSOCIATION. Among the speakers of the convention were Carl Weeks, Prof. John Grasser, Dr. Joseph A. O'Hara and the New Orleans Prohibition Administrator, O. D. Jackson.

OKLAHOMA PHARMACEUTICAL ASSOCIATION.

The 33rd annual convention of Oklahoma Pharmaceutical Association was held in Oklahoma City, May 14th–16th. Among the speakers at the meeting were Denny Brann, *President* of the N. A. R. D., who is also a section officer in the A. PH. A. Other speakers were D. A. Dana, of Ft. Worth, Tex., Henderson Berkeley, of Chicago, and John W. McPherrin.

HAGERSTOWN MEETING OF MARYLAND PHARMACEUTICAL ASSOCIATION.

Following the plan which has proved eminently satisfactory, the Maryland Association held another sectional meeting, this time at Hagerstown. An interesting program was carried out. More than fifty members were in attendance. Chairman S. L. Hilton of the Council, A. PH. A., presented a valuable and instructive paper. Dr. Peregrine Wroth, former President of the Medical and Chirurgical Faculty, of Maryland, spoke of the importance of right relations of pharmacy and medicine.

OREGON CONVENTION DATES CHANGED.

The dates of the Oregon State Pharmaceutical Association convention previously announced for July 8th, 9th and 10th have been changed to July 15th, 16th and 17th.

Change was expedient because the American Medical Association is holding its annual convention in Portland the week of July 8th and it was felt that a conflict in dates would affect the attendance at the Oregon convention. On the other hand, it is hoped that it will be possible to secure as speakers for the Oregon meeting one or more eastern representatives of national organizations who will be in Portland to attend the American Medical Association meeting. The place of meeting remains at Seaside, with convention headquarters at the Seaside Hotel, where many delightful Oregon conventions have been held in the past years.

WEST VIRGINIA PHARMACEUTICAL ASSOCIATION.

If the attendance at the West Virginia Pharmaceutical Association will measure up to the fine publicity which Secretary J. Lester Hayman has been sending out, the attendance will include 100 per cent of the membership. Among the speakers scheduled for the meeting are: Theodore D. Wetterstroem and M. N. Ford, of Ohio; C. Leonard O'Connell, of Pittsburgh; John A. Goode, of Asheville; Ross Wills, State Commissioner of Prohibition; and J. C. Crowley, Federal Narcotic Inspector.

A visit to the School of Pharmacy is on the program, where the members will be received by President John R. Turner and Professor A. Gordon Bergy.

WASHINGTON STATE PHARMACEUTICAL ASSOCIATION.

Secretary Harry W. Ayres in a recent letter, issued from his office, listed the bills which were before the State legislature and affected pharmacy in one way or another. He states that no bill inimical to the retail drug trade

was passed. The Association will meet June 19th–21st at Hotel Olympic, Seattle.

GOLDEN JUBILEE MEETING OF TEXAS PHARMACEUTICAL ASSOCIATION.

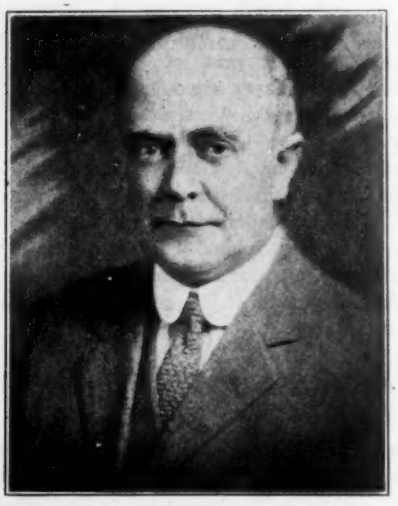
Secretary Walter D. Adams reflects on the progress made by pharmacy in Texas since the Association was organized. He refers to the fact that in the spring of 1879, twenty pharmacists assembled in the town of Dallas and after matured deliberation decided to organize the Texas Pharmaceutical Association, the purpose being to advance the knowledge of pharmacy and to protect the public health by educating the public to the necessity of better pharmaceutical practice. The small nucleus of 1879 has grown into an organization numbering 5000 members, in 1929. The Golden Jubilee Convention will be held in Fort Worth, June 18th–21st.

UTAH ASSOCIATION MEETS AT OGDEN.

Utah will hold its 1929 convention at Odgen on June 20th and 21st. Among the speakers will be D. F. Jones, of Watertown, S. D., president of the AMERICAN PHARMACEUTICAL ASSOCIATION, and S. F. Worswick, of San Francisco.

KAPPA PSI PHARMACEUTICAL FRATERNITY.

Grand Regent W. Bruce Philip of San Francisco is sending out a communication to the members of Kappa Psi Pharmaceutical Fraternity suggesting the possibility of holding an informal meeting at Rapid City and asking that those who will attend, express themselves relative to the time that such a meeting would be most convenient, possibly on Saturday preceding the convention.



W. BRUCE PHILIP.
Grand Regent, Kappa Psi.

There are always quite a number of fraters in attendance. However, it is not possible to have a called meeting of the fraternity with the demand that each chapter send a representative or pay a pro-rated part of the expense. The Grand Regent suggests to the members that there are many things which can be discussed for the development of plans to be considered during the coming year for adoption or rejection in 1930. He also indicates that it will be impossible to meet during the week of the convention.

Last year at Portland there was a called meeting and it was certainly well attended and a success in every way.

KAPPA EPSILON HOLDS CONVENTION.

BY ZADA M. COOPER.

Kappa Epsilon, national pharmaceutical sorority, held its annual conference at Lincoln, Nebraska, April 5th and 6th with Beta Chapter of the University of Nebraska as hostess.

The two days were very busy ones. Much business was disposed of because much thought had been given to it in advance of the meeting by Miss Kenefick and other members of the Council and, because there was splendid coöperation.

All the Chapters were represented by one or more delegates and the entire active membership as well as several alumnæ members of Beta Chapter were in attendance. Following is the list of delegates: Alpha Alumnæ, Alice Scheer; Alpha, Laurine Jack, Lois Williams and Lillian Kellenberg; Gamma, Myrtle Snyder; Delta, Muriel Stoner; Epsilon, Rose Marie Zubricky and Miriam Fowler; Zeta, Gladys Bauer and Florence Bloss; Eta, Emma Pejsa. Naomi Kenefick, Grand President and Jeanette Christgau Douglas, Grand Secretary were present, also.

Delta Chapter, for the second successive year, was awarded the tropy for the highest scholarship average. Zeta ranked second and Gamma third. Individual honors went to Elida Larson, Gamma; Laurine Jack, Alpha; Helena Bunge, Gamma and Muriel Stoner, Delta.

Alumnæ of Zeta and of Gamma had peti-

tioned for charters as alumnæ chapters and the petitions were granted.

The Student Loan Fund was increased by the addition of $100.00 from the treasury.

The officers elected are: *President*, Naomi Kenefick, Eagle Grove, Iowa; *Vice-President*, Jennie Banning, Lincoln, Nebraska; *Treasurer*, Miriam Fowler, Columbus, Ohio; *Council Member*, Zada M. Cooper, Iowa City, Iowa. The other officers, elected in even-numbered years, are: *Secretary*, Jeanette Christgau Douglas, Plainview, Minn.; *Historian*, Mercedes Anderson, Minneapolis, Minn.; *Council Member*, Mary Langevin.

The social affairs included a formal dinner at the Lincoln Hotel. Ethel James, president of Beta Chapter, was toastmistress, each chapter responding to a toast. The dinner was followed by a reception and dance given by the Kappa Psi fraternity at the chapter house. Mrs. Weaver, wife of the Governor, gave a tea at the Governor's mansion and the final courtesy was a dinner by the faculty wives at the home of Professor Bukey. Following the dinner, officers conducted a model initiation.

Kappa Epsilon now has seven active chapters located at the following schools: *Alpha*, University of Minnesota, Minneapolis; *Beta*, University of Nebraska, Lincoln; *Gamma*, State University of Iowa, Iowa City; *Delta*, State University of Montana, Missouri; *Epsilon*, Ohio State University, Columbus; *Zeta*, University of Wisconsin, Madison; *Eta*, Western Reserve University, Cleveland.

NEW JERSEY BOARD OF PHARMACY.

Secretary R. P. Fischelis announces for the Board of Pharmacy of the State of New Jersey that the next written examination for the Registered Pharmacist Certificate will be held at the State House, Trenton, on Thursday, July 18th, at 10:00 A.M.

The next examination for the Assistant Pharmacist Certificate will be held at the State House on Friday, July 19th, at 10:00 A.M.

Applicants for these examinations must have their formal application on file not later than June 20th. The necessary forms can be obtained by writing to the Board office at Trenton, and all applicants are advised that the examination fee is now $25.00 and that applicants for the Registered Pharmacist Certificate must be graduates of a three-year course in Pharmacy approved by the Board, and applicants for the Assistant Pharmacist Certificate must have successfully completed at least two years in a College of Pharmacy approved by the Board.

PHARMACEUTICAL STANDARDS INCLUDING TOLERANCES AND METHODS OF ANALYSIS.

We have before us a loose-leaf book giving "Pharmaceutical Standards Including Tolerances and Methods of Analysis" recommended by the combined Pharmaceutical Contact Committee of the American Drug Manufacturers' and the American Pharmaceutical Manufacturers' Association, promulgated by the Food and Drug and Insecticide Administration of the U. S. Department of Agriculture. The book contains separate pages for the twenty-six compressed tablets and seventeen hypodermic tablets on which work has been completed. The Commission is now working on "Tolerance for Ampuls" and the results will be printed on sheets to fit the book. The book is being sold through the two Associations at $2.50 a copy. It is a great convenience for those who require these references.

We are in receipt of "A Critical Revision of the Genus Eucalyptus," by J. H. Maiden, I. S. O., F. L. S., late Government Botanist of New South Wales. Vol. VII, Part 10 (Part LXX of the complete work). With four plates. Issued by the Government Printer, Sydney, Price $^2/_6$. Mr. Maiden did not live to see his great work completed. Prior to his death he had, however, prepared the final parts for publication, and these will be issued as opportunity offers. The species dealt with in this part are: *E. Baxteri* (Benth), *E. Blaxlandi*, *E. Orgadophila*, *E. Acmenioides*, *E. Murphyl*, *E. Stuartiana*, *E. Angophoroides*. Mr. Maiden was an honorary member of the AMERICAN PHARMACEUTICAL ASSOCIATION, and requested that a copy of the complete work be presented to the ASSOCIATION.

The *Druggists' Circular* and the *National Drug Clerk* for April are giving fine encouragement to the proposal of adopting a pharmacy flag, as proposed by "Vernon Mount" at the Portland meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION.

INTERNATIONAL DENTAL EXHIBITION TO BE HELD AT RIO DE JANEIRO, BRAZIL.

An announcement has been received from Trade Commissioner G. H. Eickhoff, Rio de Janeiro, of an International Dental Exhibition, which will be held in that city July 14th to 21st,

inclusive, 1929. There will be held at the same time the Third Latin-American Dental Congress.

All manufacturers as well as merchants, professionals, scientific institutes, etc., are permitted to participate in the exhibition. There will be an "Invention Section," as well as an exhibition of dental publications, which will offer the publishers an opportunity to advertise their lines. The exhibition will give foreign as well as national manufacturers of dental apparatus, instruments, preparations and supplies an opportunity to advertise their goods in the Latin-American continent.

Firms interested in securing additional information regarding the exhibition should communicate with the president of the Executive Committee, Luiz Hermanny Filho, Caixa Postal 247, Rio de Janeiro, Brazil. Telegraphic address: Deposito. Correspondence may be in English, French, German or Spanish.

"BAUME DU COMMANDEUR."

M. Bouvet's paper, read recently, before the Paris Society of Pharmacy, explained how, after much careful and intricate historical research, he was able to identify the originator of the "Baume du Commandeur" (see "Chronicles of Pharmacy," II, 136). This remedy of the seventeenth century was named after the Commander Gaspard de Pernes, who became a member of the Knights of Malta in 1860. It will be remembered that according to their statutes the Knights of St. John of Jerusalem (later on known as the Knights of Rhodes, and after 1530, as the Knights of Malta) were to care for the sick, and especially for lepers, irrespective of religion. It was, therefore, quite natural that a Knight of this order should devise a balm especially recommended for wounds and sores. The exact composition, as M. Bouvet pointed out, has been modified in the course of centuries. He confessed frankly that so far he had been unable to trace why it was also termed the "Balm of Saint Victor." *Chemist & Druggist*, March 2, 1929.

PROHIBITION ENFORCEMENT TRANSFER.

Congress is to consider two bills having for the purpose the transfer of the Bureau of Prohibition in the Treasury Department to the Department of Justice. One of the bills has been presented by Senator King of Utah and another is being prepared by Attorney-General Mitchell. If transfer is made, permittees under the National Prohibition Act will be compelled to deal with U. S. District attorneys instead of federal prohibition.

NEBRASKA VETERINARY LAW CONSTITUTIONAL.

On April 15th, a Nebraska statute—requiring the licensing of persons practicing veterinary medicine and surgery and persons who diagnose or advice the treatment for diseases of domestic animals—was held to be constitutional by the Circuit Court of Appeals for the 8th District.

NARCOTIC LEGISLATION.

Senate Bill 182 of the California legislature regulating the sale, possession and use of habit-forming narcotics and other dangerous drugs has been passed by the House and Senate. A bill has been introduced in the Pennsylvania Legislature amending the drug act by including marihuana among the substances deemed to be drugs within the meaning of the act.

JUNIOR PHARMACOLOGIST FOR HYGIENIC LABORATORY.

The Civil Service Commission at Washington announces a Civil Service Examination to fill a vacancy in the Hygienic Laboratory, U. S. Public Health Service at Washington and for vacancies occurring in positions requiring similar qualifications. Full information may be obtained from the U. S. Civil Service Commission at Washington or from the Secretary of the U. S. Civil Service Board of Examiners at the Postoffice or Custom House in any city. The entrance salary is $2200.00 and higher salaried positions are filled from promotion.

Frank Randall Rohrmann, president, general manager and chairman of the Board of Directors of the Philadelphia Wholesale Drug Company, died, May 6th, aged 67 years. The deceased was on his way, in a taxicab, to the Manufacturers' Club, when he suffered a heart attack.

Mr. Rohrmann was an alumnus of the Philadelphia College of Pharmacy. Later, for a time he engaged in the practice of law. In 1892 he became associated with the Philadelphia Wholesale Drug Company and he is credited in a large measure with its success. He is survived by his wife, a daughter and a son, Ralph. The latter is assistant treasurer of the company of which his father was the president.

BOOK NOTICES AND REVIEWS.

Bacteriology and Sanitary Science. For students in Pharmacy, Chemistry and Allied Sciences. By LOUIS GERSHENFIELD, Ph.M., B.Sc., P.D., Professor of Bacteriology and Hygiene in the Philadelphia College of Pharmacy and Science. Octavo. xv, 432 pages, 20 engr. and 2 pl. Lea and Febiger, Phila. Price $4.00.

This new book has been written by Professor Gershenfeld to meet the needs in Bacteriology and Sanitary Science of students and workers in pharmacy, chemistry and nursing. Its scope is unique in that the closely related subjects of bacteriology, immunology, parasitology, sanitary science and biological products are treated in one volume from the viewpoint of a pharmacist.

The subject matter of this work is arranged in 4 parts, an appendix and an index. Part I, entitled Bacteriology, includes the following chapters: General characteristics, activities and classification of bacteria, apparatus and methods of studying bacteria, stains and staining, culture media, reaction and storage of culture media, culture technique, Bergey classification, commonly observed pathogenic and non-pathogenic bacteria, destruction of bacteria, disinfection, fumigation, the higher bacteria, fungi and useful bacteria.

Part II treats of Animal Parasitology. It includes chapters on parasitic protozoa, metazoa, arthropods, snakes, rodents and higher animals, insect extermination and insecticides.

Part III deals with Immunology and contains chapters on infection, immunity, hypersensitiveness and allergy, antitoxins, antibacterial sera and serum products, antigens used as therapeutic and immunizing agents, biologic tests as aids in diagnosis, allergic skin tests and allergens.

Part IV is entitled Sanitary Science. It contains chapters on atmospheric conditions, ventilation and heating, disposal of waste, sewage, etc., water and water purification, milk and other foods.

The Appendix contains information on diseases of unknown, doubtful or indefinitely determined causes and a page of brief comment on plant diseases.

The author has succeeded remarkably well in presenting the vast array of subjects treated in the text in a clear and interesting style. While a work of this type is necessarily technical, he has skillfully avoided the use of a superfluous number of technical terms. The proportionate space given to the various parts of his discussion is well balanced and in keeping with the stated purpose of the work in the preface.

The pharmacist is being called upon constantly by the laity to answer questions concerning sterilization, disinfection, fumigation, disinfectants, deodorants and general questions on sanitation. As the handmaiden of the physician, he should be prepared to furnish staining solutions, culture media and biological products and have a correct understanding of their manufacture and use. He should be able to converse intelligently upon all of these topics alike with physicians, health authorities and the laity. The essential information for effectively performing all of these duties is to be found in Prof. Gershenfeld's work.

A careful study of the volume shows that the author reflects a live touch with the present-day requirements of the professional pharmacist and chemist in the fields of bacteriology and sanitary science.

No American work on either bacteriology or sanitary science has heretofore been written which is more applicable to the practical needs of the pharmacist in these fields than this treatise. It will undoubtedly be generally welcomed by pharmacists, chemists, nurses and students of applied bacteriology and sanitation.—HEBER W. YOUNGKEN.

Qualitative Analysis for Students of Pharmacy and Medicine. By CHARLES B. JORDAN, Ph.C., M.S., Dean of School of Pharmacy and Professor of Pharmaceutical Chemistry, Purdue University, Lafayette, Indiana. First edition, viii + 169 pages, $2.50. Publishers, McGraw-Hill Book Company, Inc., New York, October 1928.

Before one can intelligently consider a book of this kind he must have a definite understanding as to what is meant by "Qualitative Analysis" and particularly what is meant by Qualitative Analysis for Students of Pharmacy and Medicine. If "Qualitative Analysis" is limited to the usual examination of substances for metals and acid radicals and in addition the usual so-called group separation of metals, the title of this book is appropriate. If Qualitative Analysis for Students of Pharmacy and Medicine is identical with this the complete title is appropriate. In the writer's opinion Qualitative Analysis for Students of Pharmacy and Medicine is quite a different thing. Professor Jordan's book is "Qualita-

tive Analysis," pure and simple, but it is well done and presented in good form. Part One contains a discussion of some of the very valuable theories such as an ionization, mass action, solubility product, electron theory, valence, oxidation, reduction, etc. These definitions and discussions are very brief but are to the point and the entire part is a valuable introduction to the rest of the book. Some of the definitions approach closely the "cut and dried" order, for example that of a reagent on page 4 which is: "The substance which causes a reaction is called the reagent." It always takes two substances to bring about a reaction and it would appear difficult to tell, on this basis alone, which one of the two is the reagent. The table on page 9 is especially unfortunate in that such a large number of substances are grouped together and given a single ionization value which certainly does not apply to them all. It is very obvious that the figures in this table are intended to be approximate only, but it would have been better to include a more complete table giving exact values for these different acids, bases and salts.

Part Two is devoted to metal analysis and is the same order of treatment that is given in practically every book on so-called "Qualitative Analysis." As an example of the method of treatment typical reactions of the metals of Group One are given, followed by the usual scheme of separation and identification of the metals of the group. This is then followed by a series of questions called a review of the group. Immediately following the separation of the metals is a list of the salts and preparations recognized in the U. S. P. X and N. F. V. This plan is followed out consistently in connection with the other groups of metals, such as the hydrogen sulphide group, the ammonium sulphide group, ammonium carbonate group, sodium phosphate and soluble group. To those who like this treatment of the subject this book can be recommended. Throughout this entire part the writer has searched in vain for what he would call Qualitative Analysis for Students of Pharmacy and Medicine. The mere listing of the preparations of the U. S. P. and N. F. does not make the text Pharmaceutical Qualitative Analysis. In fact, there is danger that these lists will do more harm than good since the impression might be gotten that one could, for example, detect lead in lead oleate and lead plaster according to the scheme outlined for the analysis of Group One; or silver in the silver-protein compounds according to this scheme of analysis; or iron in iron-scale salts. Numerous other examples similar to the above could be given. It seems to the writer that Pharmaceutical Qualitative Analysis should enable the student of pharmacy to handle such cases as the above.

If this work is entirely pharmaceutical or medical in character the writer believes that it would also be better to simplify the scheme for metal separation by omitting tin, cadmium, cobalt and nickel, no salts or preparations of which are described either in the U. S. P. or N. F. Gold which is used in medicine to a much greater extent than any of the above is not included in the scheme.

The list of questions, or review, which follows each group, contains many questions which are calculated to bring out the student's ability to think and apply what he learns from the text. Many of the questions are more pharmaceutical in character than they are chemical, however.

Part Three is a scheme of analysis for the identification of the acid radicals. These acid radicals are divided into eight groups, and the scheme which the author has adopted seems to be as good as any that has been proposed. Throughout this part again appears lists of the preparations of the U. S. P. and N. F. The scheme of analysis does not, however, include directions for the detection of iodine in the U. S. P. ointment; or iodide in decolorized tincture of iodine; or boric acid in ointment of borax; or salicylic acid in methyl salicylate; or citrate in iron and ammonium citrate; and numerous other examples which in the writer's opinion are strictly speaking Pharmaceutical Qualitative Analysis.

For those who are searching for a book on the usual Qualitative Analysis which is concise, well organized, and contains a minimum amount of theory to be of real value, this book can be recommended. It is well gotten up, well printed, well bound, and contains very few errors, the only ones noted by the writer appearing on page 105 in which the word slaked is misspelled, and an incorrect formula for calcium hydroxide is given.—A. H. CLARK.

Ein Lehrbuch für Ärzte, Medizinalbeamte und Medizinstudierende. Toxikologie, Ein Lehrbuch für Ärzte, Medizinalbeamte und Medizinstudierende, by DR. E. STARKENSTEIN, DR. E. ROST AND DR. J. POHL; Urban & Schwarzen-

berg, Berlin and Vienna, 1929; unbound, 24 marks; bound, 26.50 marks.

This latest text, or reference book, on toxicology, comprising a volume of some 531 pages, possesses certain features of especial interest and value. In the first place, it is "a textbook for physicians, health officers and students of medicine," by three of the most prominent pharmacologists of Central Europe. These are E. Starkenstein, professor of pharmacology and pharmacognosy in the German University of Prague, E. Rost, professor of pharmacology at the University of Berlin and J. Pohl, professor of pharmacology in the University of Breslau. The names of these three well-known scientists are a guarantee that the book before us is reliable and worthy of perusal. In the second place, the present textbook on toxicology, while comprising a volume of not too great proportions, is exceptionally rich in literary references, including some of the most recent ones. This feature always renders a scientific handbook very much more useful for the serious-minded specialist in any branch of science. In the third place, the book before us contains an unusual number of rich and striking illustrations, certainly in greater profusion than any other textbook of its size that we have seen in recent years. Here we find some twenty-four beautifully colored plates, depicting various pathological conditions encountered by the toxicologist during a period of active practice extending over many years. These plates should be of particular value to the uninitiated student and even the practising physician, who is not familiar with toxicology. While some of the plates depict pathological specimens described in other textbooks, many of the plates are not only original but unique in their beauty from the standpoint of medical art. Among the most interesting of these are the picrures illustrating phosphorus poisoning, a condition comparatively rarely met with in the United States, poisoning with glacial acetic acid, bichloride of mercury, phenol and others. In addition to these plates, the book contains some thirty-four other interesting cuts and illustrations.

A fourth invaluable feature of the present work is a profusion of all kinds of tables for rapid reference concerning cases of poisoning. Thus we have ten pages of tables compiled by Professor Starkenstein, which contain an index of clinical symptoms and circumstances occurring after various toxicological conditions. This handy reference table should prove invaluable to the practitioner of medicine in orienting himself concerning emergency cases, which he is almost bound to meet at some time or other. Another extensive table, comprising six pages, gives an index of pathological anatomical findings discovered in various poison cases. Such a table should be of special interest to the general pathologist regarding post mortem examination in medico-legal cases. There are other tables of more direct interest to the specialist in pharmacology and toxicology. These contain, for instance, lists of poison gases and fumes and their relative toxicity and a long list of occupational poisons, classified according to different industries and trades, tables describing the sources, principal properties and toxicity of various alkaloids and glucosides, a long table giving the botanical classification of poisonous plants, tables indicating the principal sources of intoxication through foods, a table exhibiting the most common toxicological agents employed in homicide and suicide and, last but not least, an excellent reference table concerning a large number of poisonous dyes, giving their chemical constitution, common names and more important physical and chemical properties.

The text proper is logically divided into two divisions, designated as *General Toxicology* and *Special Toxicology*. Under *General Toxicology*, by Professor Starkenstein, poisons are defined and various conditions bringing about a toxicological action of drugs and chemicals are more or less discussed. Another chapter gives a subdivision of various poisons from several points of view—acute and chronic, exogenous and endogenous, local and constitutional, etc., etc. Another chapter is devoted to the discussion of general symptoms and diagnosis of poisoning. Still another chapter deals with prophylactic measures of special interest to the health officer and specialist in preventive medicine. Several chapters are devoted to a general discussion of the therapeutics, or treatment, of poison cases. There is also a chapter on the legal aspects of poisoning, including valuable statistics and, finally, a comprehensive bibliography is appended to this part of the book.

Under *Special Toxicology*, a subdivision is made of chemicals, drugs or poisons with primarily *local* effects, including acids, alkalis, toxic salts, poison gases, irritating oils, resins, etc., while a larger section deals with the

constitutional effects of various poisons after absorption by the body. Here all the common and many of the uncommon poisons are discussed in sufficient detail for the purposes required by the general practitioner and student of medicine. Professor Rost contributes a most interesting discussion of ethereal oils, saponins, irritating plants, and a discussion of animal poisons, which is known to be one of his specialties. Professor Rost also describes poisonous fungi, poisons of the anthracene, phenanthrene, pyridin, quinolin and acridin series, and the whole subject of alkaloids and glucosides, comprising nearly one hundred pages. Professor Pohl has written an especially interesting account of some of the aliphatic organic compounds and chemical and therapeutic agents of the benzyl and naphthalin series and a description of organic arsenicals. Professor Starkenstein, in addition to writing the entire general portion of the book, is also responsible for a description of other kinds of poisons, including those acting locally, acids, alkaloids, metallic poisons (including mercury), phosphorus, blood poisons, etc.

In reviewing the work, one cannot help giving credit to the authors for their excellent judgment in selecting literary citations, or references, and in this work, American scientists have certainly no reason for complaints in regard to omission or lack of appreciation of their work. Altogether, the book is one of the best single-volume texts on toxicology that we have had the pleasure of reviewing.—D. I. MACHT.

Dr. Charles E. de M. Sajous, well and favorably known for his research in endocrinology, died at his home in Philadelphia, April 27th, aged 76 years. He was an author of "Sajous' Cyclopedia of Practical Medicine," and several volumes on the subject of which he was considered a leading authority—the ductless glands and their influences in the human body.

U. S. P. BOARD OF TRUSTEES PROVIDES RESEARCH FUND.

The Board of Trustees of the United States Pharmacopœia approved of a recommendation to set aside a fund of $20,000 for pharmaceutical research as a memorial to Prof. Joseph P. Remington, former Chairman.

E. Fullerton Cook, Chairman of the Revision Committee, presented his report, devoted largely to research matters. In addition to the organizations named elsewhere in this issue of the JOURNAL, recommendations were adopted to include as entitled to representation in the Convention—The American Pharmaceutical Manufacturers' Association and Cuba. The latter recognition is given because of the translation of the U. S. P. into Spanish by the University of Habana, and adopted as official in Cuba.

SCIENTIFIC SECTION OF THE PROPRIETARY ASSOCIATION.

The scientific section of the Proprietary Association met at the Chemists' Club, New York City, on the evening of May 7th, with an attendance of thirty-six members. Many interesting and helpful questions were covered during the course of the meeting. The officers of the section are: Philip I. Heuisler, Baltimore, *Chairman;* Dr. E. C. Merrill, Boston, *Vice-Chairman;* Dr. Charles E. Caspari, St. Louis, *Second Vice-Chairman;* E. F. Kemp, Washington, *Secretary.*

The Hanbury Medal presented to Prof. John Maisch, 1893.